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VASCULAR CRISES AND ANGIOSPASM

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WE have long been more or less familiar with states of generalized hypertension or hypotension; but the idea of localized vaso-constriction as an explanation of many physical phenomena hitherto rather obscure, is permeating medical consciousness somewhat slowly.

In a paper, published in the Canadian Medical Association Journal for 1911, Sir William Osler, always appreciative of the work of others, recounts how, in 1911, Dr. George Peabody narrated cases of transient hemiplegia and aphasia without loss of consciousness, cases in which at autopsy, although extensive arteriosclerosis of the cerebral vessels was found, there was no focal lesion such as hæmorrhage, embolism, softening or œdema. The explanation offered by Dr. Peabody was that there might well have been a recurrent spasm of tne middle cerebral, or its branches, which had been sufficient, plus the thickening already present, to cause ischæmia of important brain areas, and that, in the final attack, this spasm and ischæmia lasted long enough to cause death; but that it was not complete enough, or of sufficient duration to cause softening. Peabody urged that in certain cases of transient loss of vision, spasm could be *seen* in the retinal vessels, and that therefore it was not unlikely that loss of function could, in local vascular areas of the brain, be similarly due to ischæmia. The value of Peabody's observations was early recognized by Osler, who has himself contributed to the now rapidly growing literature of the

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subject. But as far back as 1893, Solis-Cohen, of Philadelphia, began to attack the subject from a different angle. In a series of papers since then, he has elucidated for us the subject of "vaso-motor ataxia." He has shown that there is a type of individual that possesses an inherent instability of the vaso-motor mechanism, so that an abnormal response takes place in the way of generalized, or often focal, vaso-constriction or vaso-dilatation (or, according to Solis-Cohen, both combined) under influences which would normally be ineffective. It was, however, the now widely known monograph of Professor J. Pal, of Vienna, "Gefässkrisen," 1905, that focused interest on the subject. This term, "vascular crises," was first employed by James Collier in discussing the features of erythromelalgia.

Under this term Pal includes all conditions which are associated with more or less sudden constriction or dilatation of the arteries, and whose symptoms and signs disappear or markedly diminish as soon as this paroxysmal change in the blood vessels passes off. His contention is: "Where the tension is produced by contraction in a definite vascular area, local consequences follow and dominate the picture. These are manifest chiefly by a peculiar painful sensation and local disturbance of function. General phenomena to a greater or less extent are manifest at the height of the tension" (quoted by Hirschfelder). Pal divides the vascular crises into: (1) Vaso-constrictor or hypertensive crises, and (2) vaso-dilator or hypotensive crises. To the former far more attention has been paid by clinicians. Pal also makes a regional division into (*a*) cerebral, (*b*) pectoral, (*c*) abdominal, and (*d*) peripheral crises. Using the condition of lead poisoning as an illustration, he brings the headaches, convulsions and coma, the transient amblyopias, the colic and occasional anginoid attacks under one common denominator—a marked rise of blood pressure, associated with more or less localized arterial spasm. Similarly in arteriosclerosis, uræmia, and tabes, many of the attacks of pain and fleeting loss of function can be thus best explained.

The writer finds it difficult to get a short clinical classification that will embrace all cases, but suggests the following one: (*a*) The neurotic group, including the vaso-motor ataxy of Solis-Cohen, the migraines, and possibly epilepsy (A. E. Russell); (*b*) The degenerative or cardio-renal-arterial group; this to include the crises of arteriosclerosis, nephritis, plumbism, some of the gastric crises of tabes (Pal), the peripheral claudications, and those of the spinal cord.

Since the publication of Pal's monograph, the literature of angiospasm and the vascular crises has become considerable. It will be remembered how ably Dr. A. E. Russell in the Goulstonian Lectures, 1909, advocated the thesis that focal angiospasm (or combined spasm and dilatation) is the immediate underlying factor in the epileptic seizure. He also urged the same causation in the case of migraine; Pierce Clark (*Am. Jrl. Obstetrics*, November, 1912) has written up the subject of vasomotor and trophoneuroses, naming amongst the clinical associations of angiospasm, neurasthenia, hysteria, traumatic neuroses, affections of special organs, angina pectoris (in its functional form) abdominal disturbances, nervous dyspepsia, and other conditions.

The cerebral crises have naturally attracted most attention. Sir William Osler and others have written on the grosser manifestations—the transient hemiplegias, monoplegias and aphasias. Whilst only the other day Professor William Russell, of Edinburgh, attributed to cerebral angiospasm the fleeting loss of memory, the attacks of mental obscuration and of inability to perform ordinary work, the recurring vertigo and other phenomena so often seen in elderly people with sclerosing vessels.

As regards that much debated point, the true cause of the pain phenomena in *angina pectoris*, one may merely refer to the widely held view that myocardial ischæmia due to spasm of the more or less diseased coronary arteries is an essential factor in its production in some cases at least. An extensive network of nerve fibrillæ has been demonstrated on these vessels (by Déhio, if I mistake not, in 1903). The wide extent of the referred pain areas in some cases of angina, involving spinal segments either above or below those in definite connexion with the heart and its immediate blood supply, have led many observers to the conclusion that the vascular crises *must* affect at times other visceral branches of the abdominal aorta. Thus Charles F. Hoover (Osler's "Modern Medicine," art. Angina Pectoris) thinks that the gastric symptoms described in some cases have been caused by disease of the arterial supply to the stomach, and not by referred pains from the heart, "so that the respiratory symptoms and nervous symptoms, and symptoms from the abdominal viscera, which have been so closely linked with attacks of angina pectoris are merely concomitant symptoms, and do not sustain an essential relation to cardiac angina."

There can be little doubt that these visceral crises have been responsible for the occasional opening of the abdomen, with negative surgical findings.

The peripheral crises, "intermittent claudication," Raynaud's disease, and its allies, are too well known to detain us; but I may remind you that Déjérine long ago described for us (and has recently repeated the description with all the *verve* and clarity of the French school) intermittent claudication of the spinal cord. This writer lays stress on its commonly syphilitic origin, its differentiation from peripheral claudication, and its inevitable result (if unchecked by treatment) in chronic spastic paraplegia.

Finally, to emphasize the wide application being made to-day of the angiospasm and claudication idea, reference may be made to two interesting recent papers. In one of these Solis-Cohen describes the angioneurotic affections of joints (*Am. Jrl. Med. Sciences*, July, 1914), in the other J. Ramsay Hunt quotes cases to illustrate the condition he names "ischæmic lumbago," or the lumbar type of intermittent claudication. He points out that, for diagnostic purposes, bending movements of the spine may be used to induce the pain and demonstrate its local and intermittent character. The movements of the spine are normal and in the beginning painless—an important distinction from lumbago of rheumatic origin. Another point is that the pain is not influenced by changes of weather (*Am. Jrl. Med. Sciences*, August, 1914).

The conditions underlying the vascular crises are complex, and can only be touched on here. J. M. Wolfsohn (*Jrl. Am. Med. Assn.*, May 16th, 1914) gives the following table of adequate stimuli capable of producing effects through the visceral nervous system:

1. Electric stimuli.
2. Mechanical stimuli.
3. Chemical stimuli, including those of:
    a. Exogenous origin.
    b. Endogenous origin: (a) hormones, (b) internal secretions, (c) toxins, etc.
4. Emotions (probably ultimately chemical).

As regards vaso-motor equilibrium, we recognize that the blood supply to any part of the body is regulated, in accordance with its functional needs, by a delicate adjustment between the vertebral sympathetic with its ganglia and plexuses on the one hand, and the autonomic system (vagus and its congeners) on the other. Any derangement of this balance between these more or less antagonistic divisions of the vegetative nervous system predisposes to vascular phenomena such as we are considering. This balance has been shown by the studies of Eppinger, Falta, and others to be

upset in many pathological conditions, so that we may now recognize one class of subjects which is vago-tonic and another class which is sympathico-tonic, according to which factor is predominant. In some conditions, as Hirschfelder states, there occurs overaction, in others underaction of both systems simultaneously. Eppinger and Hess give the following table of tonic nerve effects: (quoted by Hirschfelder, "Diseases of the Heart," 1913):

	Vago-tonic	*Sympathico-tonic*
Pupil	contracted	dilated
Bladder	contracted	relaxed
Cardia	contracted	relaxed
Stomach	contracted	relaxed
Pulse	slow	accelerated
HCl secretion	increased	diminished
Glycosuria	diminished	increased

It is stated that those in whom there is overaction of the vagi show particularly marked effects from the administration of atropine and pilocarpine, whilst those with overaction of the sympathetic are very sensitive to adrenalin. Thus, as Abrams, of San Francisco, points out, symptoms or diseases (asthma, angina pectoris) due to increased vagus tone are accentuated by pilocarpine and ameliorated by adrenalin and atropine.

The *internal secretions* in this relation cannot be considered apart from the sympathetic nervous system. Von Anrep (*Jrl. of Physiology*, xlv, 5) from his recent experimental work concludes that every rise of blood pressure brought about by the agency of the nervous system involves the coöperation of the chemical mechanism represented by the suprarenal glands. Cannon and his associates have shown that fright, anger, asphyxia, and the strong stimulation of sensory nerves all cause (in animals) an increased secretion of epinephrin into the blood. "The adrenalin cells and the sympathetic nerves belong to a common system, whose first duty is that of sustaining the activities of the circulatory muscles" (T. R. Elliott, *Brit. Med. Jrl.*, June 27th, 1914).

Blackford and Sanford of the Mayo clinic have recently demonstrated the existence of a powerful depressor substance in the thyroids and blood serum from patients affected with exophthalmic goitre. Such data as these, day by day accumulating, impress on us the importance of the rôle played by the internal secretions in the correct regulation of the vascular mechanism. The subject is all too wide and inchoate to be more than lightly touched on; but

reference may be made to the recent work of Professor Barker, of Johns Hopkins, on the clinical significance of the autonomic nerves supplying the viscera, and their relations to the endocrine glands (CANADIAN MEDICAL JOURNAL, August, 1913); whilst to those who approach the subject with an open mind, the work of Charles Sajous, of Philadelphia, on the internal secretions, supplies much food for thought.

Toxins. These may be either exogenous (and it has been shown that pressor substances may arise from the decomposition of proteins in the intestine) or endogenous; whether their action on the circulatory system is direct or indirect is here immaterial.

It was shown by Gaskell that normally the acid products of metabolism dilate the peripheral vessels, thus providing for their own removal. The varied ways in which this delicate mechanism might be interfered with by metabolic poisons formed in the tissues with possible failure or reversal of this process at once suggest themselves.

As regards the condition of the vessel walls, and the general blood pressure, it appears to the writer that vascular crises may occur either in vessels that are clinically healthy, or that are obviously diseased, or that may reasonably be inferred to be diseased from the general data obtained on examination. The frequency of patchy or segmental changes suggests that this irregular distribution might be an added factor. Though a *general* hypertension is often preëxistent in many instances of angiospasm, the crises may occur in cases where the blood pressure is normal or even subnormal. The spasm may be more or less generalized; but is typically localized to a special area of arterial supply.

Sir William Osler found his cases of cerebral crises fall into these categories: (*a*) that of healthy individuals with rather high blood pressure, but without signs of arterial diseases; (*b*) that of persons with well marked arteriosclerosis, to whom the cerebral attacks came without warning—indeed as a "signal symptom;" and (*c*) that of those with advanced sclerosis and cerebral changes, manifested in diverse ways. Most of Sir William's cases have fallen into the second group. In the writer's opinion it would defy the very elect to say in some cases whether an added element of angiospasm be present in addition to permanent organic narrowing or not, since the latter would be adequate explanation of functional failure under excessive functional demands of any part or organ. Intermittence with recurrence at short intervals would seem to favour angiospasm. As to the relative part played by spasm and

dilatation in the so-called functional cases, let me remind you of S. Solis-Cohen's contentions as expressed in his original paper on vasomotor ataxia. He wrote, "*Ataxia*, rather than hypokinesis, because excessive vascular dilatation and excessive vascular constriction may be either spastic or paretic or *both* spastic and paretic, as dilator or constrictor nerves or both are affected; and, even in the extreme and opposite types of vasomotor ataxia, the phenomena, while always more or less paroxysmal, are neither exclusively those of dilatation nor exclusively those of constriction, but both abnormal dilatation and abnormal constriction are usually present in varying degrees in the same patient." "The influences under which these phenomena are displayed are, more especially, temperature—and cold more than heat, emotion, visceral and external reflex excitation, and the action of toxic agents, formed in the organism or introduced from without."

The prognosis and treatment of the vascular crises is naturally that of the underlying conditions, and requires no consideration in a paper of this scope.

Conclusions. 1. The vascular crises are probably of more frequent occurrence, and explain best a much greater variety of clinical signs and symptoms in so-called functional and in organic disease, than we have hitherto admitted.

2. A complex mechanism underlies their production, which an intensive study of the vegetative nervous system, and of the interactions of the ductless glands will in due time make more easily understood.

3. They give rise to phenomena which are transient, and tend to recurrence. These may be in the nature of pain, or of disorders of function—motor, sensory or secretory, singly or combined.

4. The newly developed pharmacologic and physical tests of the integrity of the vegetative nervous system, and the use of the nitrites will prove helpful in recognizing these conditions.

From a short series seen within the last few years, I select four illustrative cases of vascular crises.

Case 1. Transient blindness in heart disease.

A lady, aged thirty-five, was first seen in 1910, suffering from mitral and aortic disease of long standing. The heart was much enlarged, and there had been many failures of compensation. Within the last four years the patient has suffered about thirty attacks of transient blindness in one eye, usually the right, occasionally the left. These "blind turns" have always occurred at night, awakening the patient suddenly from sleep with a sensation of

alarm, and of a "queer feeling" in the head. She then discovers, in the faintly lighted room, that she is more or less completely blind in one eye. The loss of vission varies in different attacks from a general dimness of the whole field in the affected eye to complete functional loss. Vision gradually returns in from two to ten minutes on an average. At first a central red glow of light appears, which gradually widens and pales in colour until the normal field of vision is regained. The recovery can always be hastened by the administration of a rapidly acting nitrite, and as soon as the pulse (which has been found small and firm on several occasions) has relaxed under the drug, any residual blurring of the vision field is promptly cleared up. On one occasion only was the writer able to observe the fundi during the brief period of unilateral blindness. The right fundus was markedly pale and blanched as compared with the left, and the branches of the retinal arteries that could be hastily noted were narrowed and threadlike, contrasting strikingly with apparently normal vessels on the opposite side. As vision became normal the rosy hue of the fundus gradually returned, and soon assumed the same appearance as its fellow.

Similar cases with a more precise description of the phenomena have been recorded by Priestley Smith, Osler, R. Lundie, of Edinburgh, and other observers. In Lundie's case he observed the gradual return of the blood column into the constricted vessels by a series of peristaltic-like movements.

The patient here referred to has also suffered from other symptoms of which transient vascular spasm appears the most plausible explanation. Thus, at times the left hand and arm will feel numb and cold and will tingle; the hand may be felt to be colder than its fellow, and the radial artery has been noted to be temporarily smaller and more thready than the other. Nitroglycerine will promptly remove the symptoms. Again, the occasional headaches from which the patient suffers are characterized by a feeling of constriction in one or the other side of the head; they yield most promptly to vaso-dilators, and strongly suggest a localized spastic condition of the cerebral vessels as the underlying cause. Attacks of what may have been œsophagismus have been noted on two or three occasions. All these types of "vascular crises" tend to occur chiefly at or near the menstrual periods. The chronic congestion of the liver existent in this case, with probable impairment of its disintoxicating power, must be borne in mind when considering the underlying causes.

Such cases as the above are interesting because the fundus

oculi is the only place where we can *see* spasm of the arteries, associated with loss of function. They have afforded valuable evidence in favour of a definite vasomotor supply to the cerebral vessels, evidence confirmed by the work of Morison and of Gulland, although it is generally believed that the vasomotor control is a relatively feeble one. In this case the accessible vessels were apparently healthy. The usual systolic pressure was about 115 mm., but during one attack of numbness and tingling of the left arm with complaints of "tightness" in the head, the pressure was noted at 150 mm. in the left brachial. Prompt relief of symptoms, with the relaxation of the artery and fall of pressure under nitrites was obtained. For reports of similar cases in the literature reference may be made to Alfred E. Russell's Goulstonian Lectures, 1909.

Case 2. Recurring transient hemiparesis and aphasia in an apparently healthy subject.

In 1909, a previously healthy man, aged forty, of excellent personal and family history, was seen in consultation two hours after the onset of the attack described. The immediate history was as follows; the previous afternoon he was exposed to cold and damp while curling, getting thoroughly chilled. On returning home he partook of a meal which included tinned fish, and retired to bed still chilly and out of sorts. He slept badly and did not feel properly warm all night; arising in the morning he was proceeding to dress, when in rapid succession he was seized with a right facial paralysis and paralysis of the right arm and leg. He got back to bed with difficulty only to discover he had lost the power of speech. Seen shortly afterwards by two physicians, he showed complete hemiparesis and aphasia. Whilst they were examining him the disability rapidly passed off, and he was able to speak and move his limbs; very shortly the loss of power returned, and his power of speech was again cut off. Again these phenomena recurred, and once more recovery rapidly took place, this time to be permanent. When seen by the writer there was little amiss to be noted. The right face was a little more flushed than the left, the skin over it a little warmer and moister, a condition which could also be traced on to the right upper trunk and right arm. The reflexes were normal on the left; also on the right with the single exception of the plantar, which was elicited with difficulty; normal flexor response on the left. The right radial felt fuller and softer than its fellow. Systolic blood pressure, R. 120 mm., L. 140. The man belonged to what the older physicians would have called the "bilious dia-

thesis." He was dark complexioned, and had been liable to attacks attributed to a sluggish liver. Slight constitutional hepatic insufficiency probably *was* present. No personal history of migraine, but his father suffered from migraine, and one brother had suffered from migraine (once with an accompanying hemianopia).

What had happened in this case? The most plausible sequence would seem to be as follows: chilling and exposure the preceding afternoon had caused peripheral constriction, driving the blood into the splanchnic pool. The typically risky type of evening meal loaded the portal vein with toxins, which the constitutionally defective liver was unable to handle and properly render non-toxic. Toxins passed through into the general circulation, and intermittent spasm of the middle cerebral artery or its branches took place as a result of the insult of the toxin-laden blood.

Four days after his seizure the patient suffered his first typical attack of left-sided migraine without any motor disorder. Regulation of diet, of the bowels, and general hygiene resulted in improved health, with no recurrence worth noting to date.

Case 3. Angina abdominis.

A farmer, aged sixty, was seen in 1910 with Dr. H. Killam, of Kings Co., N.S. He had suffered for some time previously from slight anginoid attacks, characterized by a little dyspnœa on exertion, and slight œdema of the feet. Gradually there developed a little sense of constriction in the chest with some painful radiation to one or other arm. By the time the writer saw the case the symptoms had localized chiefly in the upper abdomen, viz., attacks of severe epigastric pain, in which the stomach was seen to be tensely distended, relief coming only after the forcible expulsion of large quantities of gas. A series of these violently painful gastric distensions and explosive eructations would occur, and then the symptoms would gradually die down for an indefinite time. In a typical attack orthopnœa, marked cyanosis, cold extremities and a small slow irregular pulse would be present. There was in these latter attacks little or no radiation of pain to chest or limbs. The pain was at its height as the stomach stood out in tense relief, and abated as the gas was noisily expelled, and the organ collapsed. On examination he was found to be a rather neurotic type of man, older than his years, in moderate condition. His arteries showed marked general sclerosis; systolic blood pressure 160; heart moderately enlarged downwards and to the left, sounds rather faint, clear, with some accentuation of the second aortic. There was rather exaggerated pulsation and definite tenderness over the abdominal

aorta high up. The stomach showed no obvious ptosis or enlargement. He could not eructate at will and the attacks were not necessarily induced by exertion.

Under the experimental trial of a rapidly acting nitrate, prompt relief of the succeeding attacks was secured where other remedies had failed. It was surmised that, although there was almost certainly a chronic myocarditis (past syphilis could probably be excluded), the most plausible explanation of the later fully developed attacks was sclerosis of the cœliac axis or its coronary branch, with a recurrent angiospasm. In this way an intermittent ischæmia of the stomach with paralytic gas distension might be produced. The tender aorta, the marked degeneration of all the accessible vessels, and the intermittent painful distension, confined quite definitely to the stomach, would thus be explained. Treatment by nitrites and iodides, chiefly the former, resulted in steady improvement. The patient remains fairly well and comfortable within reasonable limitations.

In two very similar cases reported by Baris and Colombe (*Bul. Soc. Méd. des Hopitaux*, January 31st, 1913) post-mortem examination revealed a partial stenosis of the origin of the cœliac axis due to a patch of atheroma. They believe such cases support the view that temporary ischæmia is responsible for certain attacks of abdominal pain in the manner of intermittent claudication. In the course of the discussion of Sir Lauder Brunton's paper on angina abdominis, (*Proc. Roy. Soc. Med.*, April, 1912) one speaker narrated the case of a woman who had suffered from similar pains, and who finally died with acute neurosis of the pancreas, associated with extreme arteriosclerosis of the pancreatic artery.

Case 4. "Fainting fits"—Hypotensive crises (Pal).

A young woman of twenty-one was seen in 1911 for so-called fainting fits, which had occurred many times during the preceding few years. She was apt to "faint," especially on rising in the morning or on suddenly assuming the erect position. On the other hand she could dance and play tennis without any threatenings or discomfort. Consciousness was never completely lost when she fell or sank down in these attacks, for as soon as the head was lowered she began to recover. On examination she was found to be a strongly built girl nearly six feet tall, with an even disproportionately long neck and body. The anæmias, mitral disease, *petit mal* and hysteria could be definitely excluded. There was a moderate ptosis of the right kidney. The blood pressure, recumbent, was 100 mm. systolic. On directing the patient to stand erect she

promptly turned pale, complained of faintness, and would have fallen without support. Within two or three minutes the blood pressure instead of rising had fallen to 80 mm. systolic. A firm abdominal bandage did away with these symptoms on repetition of this manœuvre. Obviously the splanchnic vasomotor control was inadequate, and the defect was accentuated by the very long blood column to be supported between the heart and brain, temporary cerebral anæmia resulting whenever she stood up suddenly after rest. According to Alfred Russell, two factors only are to be considered in such a case—cardiac inhibition and splanchnic dilatation. Sometimes both of these are operative, but splanchnic dilatation replacing normal constriction is here an adequate explanation. A properly fitted abdominal corset and vaso-constrictors, e.g., strychnia and ergot, resulted in marked amelioration of the symptoms.

PAROXYSMAL TACHYCARDIA

With a Review of Four Cases

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THE symptoms characteristic of paroxysmal tachycardia are becoming more and more frequently recognized and those phenomena hitherto rarely described are now classified and given their proper place among the disturbances of cardiac function, to a better knowledge of which experimental and clinical observations are continually contributing.

It has occurred to me that a record of a clinical experience of four cases illustrative of this comparatively rare condition might be of interest.

Case 1. Several years ago a patient consulted me for occasional attacks of weakness setting in suddenly with a peculiar sensation in the region of the heart. Her appearance was that of one many years older than the stated age. While scarcely sixty she looked seventy or even more. The interest of the condition centred about the heart, the rate of which during an attack was 180, with neither dyspnœa nor cyanosis. The pulsations were regular; the area of cardiac dulness was normal; the sounds clear, and no murmurs were heard. It was learned at the first visit that the patient had already experienced several such attacks during the past three years. The occasion of the onset of the attacks was unknown. The duration varied from a few hours to two days. The attacks ceased suddenly a better feeling following immediately upon a "thud" or "jolt" felt in the cardiac region. When seen on the following morning the patient was much improved, the pulse rate was 78, the rhythm regular and sounds normal.

For three years I was permitted to follow her case. The paroxysms occurred irregularly, in the intervals of which she was very well indeed, able to go about quietly without dyspnœa. The final attack, quite like the others in its onset, was protracted, dyspnœa and cyanosis appeared, and other signs of cardiac failure

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with albuminuria for the first time supervened. The heart rate was 180 to 200 per minute for a few days, then its action became very weak and somewhat irregular and death ensued.

Another case was that of a young married woman aged twenty-eight years, who was in her final attack when seen with Dr. Tilley, of Ottawa. She gave the history of recurring paroxysms for several years, coming on suddenly without warning and stopping as suddenly. The patient's heart was considered normal in the interval. The attacks lasted from a few hours to one day. The pulse ran 160 and upwards. Her last seizure seemed to be due to over-exertion. She was a woman of small stature and on a hot day had carried a block of ice and lifted it into an ice chest, the top of which was as high as her shoulders. After four days she succumbed with signs of cardiac failure and exhaustion.

The third case was that of a lady of eighty-six years who had suffered for twenty-five years from attacks of "rapid beating of the heart." Overeating seemed to bring them on. The intervals of these attacks were at first often as long as several months. Then they became shorter—a few weeks or so. During the last year of her life they recurred about every three weeks. During the month preceding death she failed very much and "died in her sleep" after several daily recurrences of the tachycardia and after œdema had supervened.

The fourth case was that of a man aged thirty-one, who was admitted to the Royal Victoria Hospital on November 25th, 1913, complaining of palpitation of the heart, vomiting and weakness.

He gave a history of having had measles and whooping cough in childhood, and at the age of twenty-nine he was confined to his bed for ten weeks, a sufferer with acute rheumatic fever. Early in this illness the patient experienced an attack of palpitation lasting for a few days. Thereafter he enjoyed nearly two years of freedom from heart symptoms until the onset of the present illness.

About the end of October he sought advice for the relief of headache and slight cough. He was told he had "congestion of the lungs" and was sent to bed. While in bed brief dimness of vision preceded an attack of palpitation which lasted two days. After a week of convalescence the patient returned to his work in the Canadian Pacific Railway store rooms where his duties compelled him to do a great deal of lifting. He worked five days, and on the evening of November 16th, while stooping, he experienced momentary blindness and palpitation. He became so ill that he was unable to go about.

When first seen on the ninth day of his illness, the striking features of his case were the intense general cyanosis, the fulness of the cervical veins without visible pulsation, and the rapidity of the heart beat—160 to 180. There was no œdema. He complained of tightness across the chest and dyspnœa was marked on exertion. He was nauseated and often coughed and vomited up blood-stained fluid. Later, nausea and vomiting were distressing. The liver was enlarged and tender. The urine contained a trace of albumin with a few granular and hyaline casts. The lung areas gave few signs of any abnormal condition save a few moist râles at the bases, especially on the right side. The heart was somewhat enlarged to the left. The sounds clearly heard anywhere over the thorax were singularly regular and free of murmurs. The patient's condition did not improve. The pulse showed a tendency to increased rate with diminished volume until on November 27th an accurate count at the wrist was impossible. On this date œdema of feet was first noticed.

On November 30th, the patient was very restless and much distressed with dyspnœa and precordial pain. There was dulness over both bases, more marked on the left, and viscid bloody sputum was expectorated in considerable quantity. The heart continued regular when last auscultated fifty minutes before death. The patient died on the evening of November 30th, after an illness of about one month. Death was manifestly the result of heart failure gradual and progressive.

A passage from the history of this patient is helpful in explaining the terminal events: As far back as he can remember he was the subject of attacks of palpitation of the heart. The onset was always sudden, usually when the patient was at work. "A tremendous thump" followed by a "fluttering sensation" marked the onset, or this sensation would be replaced by "everything about the patient turning black for a few seconds with staggering" followed by the fluttering as described above. One or the other group of sensations signalled the onset, but never a combination of these.

He never lost consciousness with an attack. Vomiting was often present even at the onset and persisted throughout. The onset was usually determined by fatigue, transient illness or heavy meals. It is remarkable that the patient usually continued at his work. The duration varied from six hours to three days, while the frequency increased with his age, yet from 1900 to 1906 while the patient was in the army he did not experience a single attack. With but one exception all the attacks set in during the day time.

The patient averred that the attack left him "as suddenly as it appeared." After a "thump" felt in the region of the heart, all his discomfort was over and save for a sense of weakness he was fully restored.

In the light of the very clear description of recurring attacks so much alike it seemed that this case should be classed as one of paroxysmal tachycardia. The history of acute rheumatic fever and the fact that the patient frequently spat blood during a seizure suggested one of the most common conditions associated with such attacks, namely, mitral stenosis and myocardial degeneration. Multiple pulmonary infarction was believed to be present also. Autopsy findings bore out this diagnosis. There was considerable fibrosis of the heart muscle, while the bundle of His was uninvolved.

It is a matter of regret that neither sphygmographic nor cardiographic tracings were made on three of the cases. The conditions under which they were observed made this very difficult. The tracing of our fourth case showed the pulse rate regular, and, when taken, of the rate of 170.

The diagnosis may be made in the greater number of such cases by a careful history and an observation of the circulation in the ordinary way. An electrocardiograph or sphygmograph aids in determining obscure cases and also in deciding between the types which may be present.

The following clinical features, by means of which diagnosis is made, already mentioned in our case reports may be repeated for emphasis:

(*a*) The sudden onset—in but a few seconds the rate of the heart beat may be double the normal rate, or even 245 (Hutchison).

(*b*) The regular rhythm of the pulse.

(*c*) The sudden offset—the pulse rate becoming normal in a few seconds—and if there has been discomfort about the chest, tightness, slight dyspnœa, etc., relief comes quite as suddenly from these.

One must not forget that symptoms may be referred to other organs, e.g., the stomach or the lungs, as illustrated by one of our cases; possibly the peritoneum too may be suspected as diseased, should vomiting and collapse ensue. The heart in acute alcoholism and the heart of goitrous patients often show tachycardia. The history helps very much in the diagnosis of these cases. Auricular fibrillation may be distinguished by the irregularity and the absence of the *a* wave in the tracing.

The onset is attributable to a variety of causes—emotion, posture, stooping, an effort in an unusual position, e.g., carrying ice and lifting it into a refrigerator, overeating, "hacking" to clear the throat, as described in one of Dr. Moffat's case reports.

Such causes are effective, however, only under abnormal conditions of the heart muscle or of the cardiac nerves. Impulses of extrinsic origin arising from a single site originate the attack and, setting the pace, control for a shorter or longer period the cardiac rhythm. Lewis maintains that the first paroxysmal beat is premature and that in the offset there is a characteristic "post-paroxysmal" pause. The pathology of this comparatively rare condition is not yet made out. Experimentally such a regular rapid rate may be induced in hearts by repeated rapid faradization (Hirschfelder) or by tying the descending branch of the coronary artery (Lewis).

Isolated premature contractions occur, explained from the point of view of pathological or heterogenetic impulses. From this to repeated impulses from the same foci is another step, and should several extrinsic foci become active the heart responds irregularly to pathological impulses, and fibrillation is the condition described. There seems but little doubt that premature heart beats are determined by an irritable cardiac muscle—a weak muscle, or an overworked muscle, or a muscle under the influence of some poison. It is highly probable too that several factors may be active in bringing about this result.

In most instances the theory of altered nutrition of the heart muscle is called upon to explain the alteration of rhythm. On the other hand is it possible that in paroxysmal tachycardia a sensitization of the tissues in the cardiac mechanism takes place in a manner similar to that accounting for asthmatic seizures,—an anaphylaxis under another form—the recurrences in part by reason of the disturbances in circulation inducing the condition of myocardial degeneration, dilatation and death? Or again, is the cause to be found in a poison produced under certain conditions in the body which, acting directly upon the heart muscle like poisonous doses of aconite, induces such great acceleration and eventually fibrillation and death? With the increase of our knowledge of physiological chemistry, disturbances of metabolism are regarded more and more as accountable for disturbances of function. Epilepsy, tetany, spasmophilia may be mentioned as illustrations of diseases closely related with intervals of practically a normal condition. These three diseases are marked by suddenness of onset, spasms and

violent motor disturbances. It would seem possible that a natural or induced irritability of the cardiac muscle may respond to the action of certain toxic substances so that the phenomena of paroxysmal tachycardia are induced.

TREATMENT. The treatment of this condition must remain unsettled until chance discovers a remedy or research directs the measures of relief based upon a knowledge of the underlying causes now not understood. Attacks may be cut short by pressure upon the vagus nerve of the neck, by the application of cold to the chest, by pressure over the præcordium (Thorne), by the use of digitalin or strophanthin, or bleeding may afford relief in those cases where dilatation is advanced. Again, under apparently identical conditions in the same or other patients these agents are useless. To control restlessness and relieve the distress morphine is often essential.

While the cases narrated in this paper have terminated fatally, one patient seems to have been helped by taking large doses of nux vomica. At all events the interval between attacks was lengthened during treatment. Whilst the attacks were brief they seemed trifling; but with short intervals and protracted tachycardia, to say nothing of advancing age, the gravity increased. The seriousness of the attack, however, is in proportion to the duration regardless of age. While this statement is of general application, a case of paroxysmal tachycardia reported by Turnbull* is a rare exception, remarkable for recovery after a protracted course of five and a half months in a man aged seventy-four years.

The heart muscle is often found degenerated in cases of paroxysmal tachycardia, and mitral stenosis and myocardial degeneration are found in a high percentage of cases. The treatment resolves itself therefore in many cases into the treatment of such conditions after the normal rate is approached or reached.

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* "Heart," Vol. iii, p. 89.

RECENT INVESTIGATIONS ON THE SEMICIRCULAR CANALS AND THEIR CLINICAL APPLICATIONS

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IT is a notable fact that for centuries, physicians have had a very imperfect knowledge of the function of the semicircular canals. A meshwork of theories was built up around this subject, unsound scientifically and inapplicable for clinical purposes. Indeed, until very recent date, the vestibular apparatus has been the field of a great deal of speculation. Professional writers on otology either copied the many mistaken theories of their predecessors, or else omitted the subject entirely.

In tracing very briefly the history of the gradual advance of our knowledge on this important subject through the ages, we find that the Greeks of old recognized and described vertigo. Then centuries elapsed without further progress until a new era was inaugurated by the physiologist Flourens, who was the first to carry out a series of experiments on the semicircular canals of different animals in order to establish their function. He cut through the canals in different species, investigated the resulting dizziness, and incorporated his findings in a book published in Paris in 1842, "Récherches expérimentales sur les propriétés du système nerveux." Now while Flourens was experimenting on animals, Purkinje was at the same time carrying out similar physiological experiments in the human. He was the first to carry out the turning experiment in man, and observed during the attack of dizziness, which followed the rotation, a peculiar to-and-fro movement of the eye-balls, so that to him belongs the credit of being the first to discover nystagmus. Years again elapsed, when the study of the labyrinthine canals received a fresh impetus from an aurist. In 1861, Ménière published his famous article in which he states that it is highly probable that the vertigo which he has so frequently

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observed in affections of the ear, is due to disease of the semicircular canals. He based his conclusions on clinical experience. Briefly, his arguments are as follows: Deafness and dizziness are frequently the only complaints of a person suffering from ear disease, and since the deafness is due to an affection of the cochlea, it is very probable that the dizziness has its origin in some pathological condition of the semicircular canals. His theory was enthusiastically received. Unfortunately, he died the same year. The next advance was made by the German physiologist, Goltz, in 1870, whose conclusions were that the physiological function of the canals is to preserve equilibrium, for when the canals are destroyed, our equilibrium is disturbed. This was shortly afterwards independently corroborated by Crum Brown, of Boston, Bruer, of Vienna, and Mach, of Prague.

Although a considerable amount of experimental and practical work was being done by men like the physiologist Ewald, of Strassburg, the American psychologist, James, and Jansen, the Berlin otologist, who was the first to operate on suppurative diseases of the semicircular canals, still the clinical side remained undeveloped. This was mainly due to the fact that there was no method at their command by which they could investigate a unilateral affection of the semicircular canals, because the turning test, which was the one employed, irritated the semicircular canals on both sides, and the galvanic experiment gave uncertain and unreliable results, as it still does to-day.

All this was changed when Robert Bárány made his epoch-making discovery of the caloric reaction in 1905. The history of it is quite interesting. As a young assistant of Politzer's in the Allgemeine Krankenhaus in Vienna, Bárány was one day syringing an ear with very cold water, when the patient began complaining of dizziness, and on observing the eyes, he noticed there was a combined rotary and horizontal nystagmus away from the syringed ear. Thinking that the extreme temperature of the water was possibly responsible for the dizziness, he ordered warmer water, and this time the water was very hot. He syringed the same ear, the patient made similar complaints, and again observing the eyes, he noticed much to his surprise, an identical movement but towards the irrigated ear. He then syringed the ear with water of body temperature and obtained no reaction. At this moment, he recognized that it must be the temperature of the water which is responsible for the dizziness, and for the nystagmus—its character and direction.

So he proved, after examining hundreds of individuals of all ages, with normal and destroyed drums, but intact labyrinths, that the normal caloric reaction was obtainable in all these cases, i.e. in syringing an ear with water of body temperature, no nystagmus is produced, nor any other ill effects, as dizziness, disturbance of equilibrium, nausea or vomiting, while cold water produces in a short time, a nystagmus in the direction away from the irrigated ear, and hot water, similar nystagmus, but towards the same side. He further studied cases with pathological conditions of the internal ear and found that where the semicircular canals or vestibular nerve were destroyed by cholesteatoma, labyrinthitis, tumour, etc., the caloric reaction was absent on that side. Operation or post-mortem examination confirmed these findings. So he established that the caloric reaction enables us to make clinically a unilateral functional examination of the labyrinth.

Without entering into excessive theoretical detail, explaining how the caloric reaction is produced in the different canals and the different positions of tne head, I would state that Bárány considers the labyrinth with its endolymph to behave like a vessel which is filled with water of body temperature. If one side is syringed with cold water, the fluid on that side is first cooled, and as its specific gravity thus becomes heavier, it falls to the bottom and the fluid on the other side must immediately rise; with hot water the exactly opposite movement occurs. The disturbance of the fluid produces irritation of the vestibular nerve endings in the cupula and impulses are in this way transmitted through the medulla to the nerves supplying the eye muscles, thus producing nystagmus.

The next advance in our knowledge of the vestibular nerve was also made by Bárány in 1909. Just at this time he was greatly impressed with Ramon y Cajal's statement in his recently published work, "Histology of the Nervous System," that the branches of the vestibular nerve form an extraordinarily large number of connexions with the cerebellum. Combining this knowledge with Bolk's conclusions that in the cerebellar hemispheres of man is the controlling influence over the muscles of the extremities, and in the vermis the controlling influence over the trunk muscles, he set about to devise a method whereby, after irritation of the vestibular nerve, he should be able to examine the extremities. He soon found one suggested by the Graefe test used in diagnosing paralyses of eye muscles, in which the method of examination is as follows: An object is placed before the patient's suspected eye (the other eye being kept closed) and he is directed to touch the

object with his finger, first with the suspected eye open and then with it also closed. The normal invariably touches it correctly, but if there is paralysis present, there will be a deviation of the finger from the object. On this principle Bárány developed his *Zeigeversuch* or pointing reaction.

Before describing the pointing test as worked out by Bárány, let us briefly trace the peripheral and central connexions of the vestibular nerve in the light of our present knowledge, based on the latest anatomical and clinical investigations. The auditory nerve has two main divisions, a ventral vestibular and a dorsal cochlear. As we are mainly interested in the vestibular nerve, we will follow it from the static labyrinth to its furthest connexions. In the labyrinth its sensory nerve endings go to the ampullæ of the three semicircular canals and to the macula utriculi and sacculi, then we meet the vestibular ganglion just prior to the exit of the nerve from the internal auditory meatus into the cranial cavity. Here it traverses the cerebello-pontine angle, enters the medulla, where it divides in the form of a Y (according to Cajal) into ascending and descending branches. In the medulla, the vestibular fibres are connected by collaterals with Bechterew's and Deiter's nucleus, and through these latter all-important centres, all the connexions are made for the nystagmus reflex and the reaction movements of the body and extremities. Now in tracing the pathway of the nystagmus reflex we find that some of the ascending branches from Deiter's nucleus join the posterior longtitudinal bundle and reach the nucelus of the sixth nerve on the same side and the nuclei of the third and fourth nerves on the opposite side, thus establishing the connexions with the nerves supplying the eye muscles, and the nystagmus reflex is complete. The pathway of the reaction movement of the body is made by some other fibres passing from Deiter's nucleus to the cortex of the vermis of the cerebellum, then to the nucleus tecti, and by the descending fibres going to the anterior horn cells of the spinal cord from where branches are sent to the muscles of the body, and thus the reaction movements of the body are formed. There is still a third set of fibres which pass from Deiter's nucleus to the cortex of the cerebellar hemispheres and from here to the nucleus dentatus, the red nucleus, Monakow's tract, lateral columns of the cord, and to the anterior horn cells of the spinal cord on the same side. This is the pathway for the reaction movements of the extremities.

Now it is the function of the static labyrinth to acquaint us with our position in space and with changes in that position, and

normally this fine mechanism is in perfect balance, but if a powerful impulse is produced in the semicircular canals, mechanically by the caloric, turning, galvanic or fistula test, the central check is abolished, the balance upset, and the result of this loss of control is disturbed equilibrium in the eye muscles—nystagmus; and the muscles of the body and extremities—the reaction movements. If the strong impulse radiates from the central vestibular nuclei in the floor of the fourth ventricle (medulla) to the vagus nuclei, we get nausea and vomiting.

Now Bárány's reaction tests for the shoulder joint are as follows: The patient, in the sitting posture and with both eyes closed or blindfolded, stretches out his arm on a level with the shoulder, and with his index finger (the palmar surface directed downward) is made to touch the examiner's, which of course is held in a fixed position. He then either moves the arm vertically or horizontally, and the normal invariably touches the examiner's finger correctly, except that there may be perhaps a slight insignificant deviation at first which is readily corrected. As it is essential that the patient should not be aware of the error he makes, otherwise he can easily correct it, the examiner should always touch the patient's finger with his own, if there is an error, and never talk in his presence except in a language which he does not understand.

We will now briefly mention how the tests in the other joints are carried out. In examining the wrist joint, the patient's forearm rests on the back of a chair, and then the patient carries out similar movements to those described above, but only in the vertical plane, with palmar surface first down and then up. To test the head and trunk, Bárány uses his pointing instrument. It consists of a metal rod ten inches long, moveable up or down, and with a band which fastens it around patient's head. With eyes closed and arms folded and the pointer in the horizontal position, the patient raises and lowers his head to the fixed examiner's finger, and also turns his head to the side and back again to the median line. In this way errors are detected in the vertical and horizontal planes. Then the pointer of the instrument is placed vertically. The head is lowered and raised and the pointer touches the examiner's finger held above it. In this way one detects errors in the frontal plane. With the same instrument but with the pointer vertical, the trunk movements are now examined. The patient with arms folded, sitting on the edge of the chair, carries out movements by bending the body forward and also from side to side, the pointer touching the examiner's finger held above it, and so errors in pointing are detected.

Bárány's theoretical explanation of cerebellar localizations is that there exist in the cerebellar cortex certain definite centres which exert upon each particular joint or its controlling group of muscles a pull or tonus in a definite and constant direction. Thus there must be at least four centres for controlling the movements of every joint, for example, an upward and downward, and an inward and outward movement for each shoulder joint, which would enable the normal individual to move the arm correctly in the vertical and horizontal planes without the aid of sight. Just as in the motor area of the cerebrum there are centres presiding over the voluntary movements of each small muscle group, so with the cerebellum, there are separate centres for different joints, e.g., the shoulder, elbow, wrist, hip, knee, ankle, neck, etc. These various cerebellar centres normally act harmoniously and coördinate the movements of the various joints. Let us consider for a moment the right and left centre of the shoulder joint. These act like a pair of taut reins between which the arm moves, and by the tone or tension which it imparts to the muscles, the arm always moves exactly up or down in the same line and touches the finger correctly, i.e., there is normal pointing. But suppose the left rein is pulled more tightly than the right, then the arm must naturally deviate to the left and there is a pointing error to the left. We can produce a stronger pull on the left rein in the normal individual by syringing the left ear with cold water and then there will be a pointing error to the left as long as the nystagmus is to the right. This pointing error of both arms to the left can only come during a nystagmus to the right, by the innervation of the outward centre of the left arm in the left cerebellar hemisphere and the inward centre of the right arm in the right cerebellar hemisphere, so that both arms now deviate to the left. We also can produce the same pointing error to the left if we cut through or paralyze the right rein so that the left one only acts. Bárány's theory of cerebellar function seems to be well established, and his localizations have been recognized by no less a body than the German Neurological Society who at their annual meeting in Breslau in 1913, awarded him the Erb medal for his researches on the cerebellum.

So far, most of our clinical knowledge has been obtained from cerebellar abscesses of otitic origin, and the lesions found have been on the cerebellar surface extending from the sigmoid sinus forward along the posterior aspect of the petrous bone to the internal auditory meatus. Of the four centres localized, by far the most important from the diagnostic standpoint, and the most commonly

involved in otitic cerebellar abscesses are the two centres exerting inward tonus upon the wrist and shoulder movements, both situated very close together in the lobus biventer—for the wrist joint, in the anterior end of the biventer lobe near the flocculus and behind the inner meatus, and for the shoulder joint, about 10 mm. behind the former. The outward centre of the shoulder joint has been localized at the margin of the hemisphere between the semilunar superior and inferior lobes, and the downward centres on the posterior and inner corner between superior and inferior semilunar lobes.

The evidence of the correct localization of the inward centres of the wrist and shoulder joints are based on the facts that cerebellar abscesses and tumours in this situation frequently produce marked outward deviation of both arm and wrist. Further corroborative evidence is adduced by the characteristic deviations following surgical injuries of the cerebellar hemispheres during operations and also by the cooling experiment. As an example, I will refer to a case operated on in the Vienna General Hospital, in which the cerebellar dura in front of the sigmoid sinus was freely exposed. The knife in the surgeon's hand accidentally slipped and entered the biventer lobe near the flocculus, and when the patient was examined on recovery from the anæsthetic, the wrist corresponding to the side of the cerebellum injured deviated strongly outwards; the other hand and arm, however, pointed correctly. In another case with suspected cerebellar abscess, but no focal symptoms, exploratory puncture was made through the biventer lobe of both cerebellar hemispheres, at the point located as the inward tonus centre for the shoulder joint. After recovery from the anæsthetic, both arms showed marked characteristic deviation outward.

Bárány further proved this physiologically by a modified Trendelenburg's method. Certain cerebellar operations necessitate the extensive removal of bone from this region and, when healed, leave only a thin epidermal covering of the cerebellum. Now Bárány experimented on such cases, and found that by cooling this area with ethyl chloride for five minutes, he temporarily paralyzed the centres for inward tonus of the arm and obtained the pointing error outwards, just as long as the cooling process continued. Two or three minutes after discontinuing the cooling the reactions were normal again. This not only corroborated the correct localization of the centres of the cerebellum, but also showed that the deviation was due to cerebellar innervation.

As regards the vermis of the cerebellum, apart from our knowledge that it has to do with ataxia, recognized as far back as 1876 by Nothnagel, there has been no definite localization of centres there. In peripheral disease of the vestibular apparatus, we also get ataxia, but in this case the direction of falling is opposite to the direction of the nystagmus, and the falling also changes with the position of the head. But if the changing of the position of the head produces no changes in the direction of the falling, then the ataxia is intracranial, cerebellar, or medullary. In these cases there may be no dizziness or vomiting, which are usually marked in the disease of the vestibular apparatus.

Examination of the Function of the Cerebellum

The examination of the function of the cerebellum is carried out either by the caloric, turning, or the galvanic reaction. In most cases all of the practical tests can be made and the information obtained in a few minutes by utilizing the caloric reaction. First, we should examine both sides for any spontaneous error of deviation, and for most practical purposes, the shoulder-joint test would be sufficient indication. We syringe, say, the right ear with cold water, and obtain a rotary and horizontal nystagmus to the left, the normal individual on attempting to stand with his feet together and eyes closed tends to fall to the right, and if we examine by the pointing test while the nystagmus is still active, there will be a pointing error of both arms to the right, describing a V-shaped movement. This is the normal. The rule is that the falling and pointing is in the opposite direction to the induced nystagmus. Now let us say, for instance, there is an abscess in the right cerebellar hemisphere which has destroyed the centre for the movement inward of the right shoulder. On examination we get a spontaneous error of the right arm outwards, that is to the right, while the left arm points correctly. Now if we produce, experimentally, a strong nystagmus to the right (through syringing the left ear with cold water, or the right one with hot water) a person with normal cerebellar centres must point both arms to the left, but if there is an abscess in the right cerebellum, only the left arm will show a pointing error to the left, while the right arm remains unchanged, still pointing outwards, that is, to the right, or it may point correctly, but there will be no deviation to the left.

These two functional changes, namely, the spontaneous outward deviation of the right arm and its failure to respond to the

vestibular irritation, give the diagnosis of right cerebellar abscess. Such cases were reported by Bárány, Brühl and others, and were confirmed by operation. After the abscess is evacuated, pressure is relieved, and the centre regains, in part, its control. In a few days the spontaneous error—pointing outwards of the right arm—disappears, but when subjected to vestibular irritation, the right arm produces no pointing error. In some cases a permanent functional change occurs.

Again as before, we syringe the right ear with cold water and produce a nystagmus to the left, and the pointing error in both arms is to the right. This we can change, by bending the head 90° forward, to a nystagmus to the right, and the pointing in both arms and the falling then change to the left. Furthermore, in case of nystagmus to the left, by turning the head to the right where it is held in a fixed position by an assistant, we get a vertical nystagmus downwards, a pointing error in both arms upwards and a falling backwards. So also by turning the head to the left, we get vertical nystagmus upwards, a deviation downwards in both arms, and a falling forwards. The upward reactions require stronger irritation than the downward. These are the normal reactions occurring promptly in normal individuals. If the caloric test gives clear normal reaction, then it is not necessary to use the turning, but in all doubtful cases, the turning test should be used as a control to the caloric.

Value of the Pointing Reaction

Bárány said that he never saw a normal individual with the pointing reaction in the arm completely gone. It is different, however, with other joints. In the elbow, wrist, hip and head, it is frequently absent in the normal. As the inward reactions in the normal are always weaker, so both inward reactions may be absent while the outward are still demonstrable. One should draw no conclusions from the complete absence of most of the reactions or symmetrical absence of the reactions inwards, but asymmetrical reaction should always be considered as pathological. While working with Bárány, I have seen cases with loss of sensation in the arms, still giving the normal pointing reaction after experimental nystagmus is produced. Physiologically, the test is universally accepted, but our knowledge of its pathological significance is, of course, still imperfect, owing to its very recent discovery.

The pointing reaction is a very valuable asset in the diagnosis of cerebellar lesions, especially otitic abscesses, tumour and trau-

matic conditions, as shown by Bárány, Brühl and others. Its presence is an important factor, but its absence does not justify the conclusion that the cerebellum is not diseased. It is quite evident that before obtaining pathological signs, there must be very marked irritation or destruction of these centres. For instance, slow growing tubercles, cysts and gliomas, may only exert partial pressure on these areas, and it may be impossible to diagnose these conditions with certainty. On the other hand, brain tumours, when associated with hydrocephalus, may exert such pressure on the posterior fossa as to give pointing errors and to make the diagnosis extremely difficult. Ruttin reported a case of a man who on post-mortem examination showed a small abscess in the cerebellar cortex, while during life his pointing was normal. Frey reported at a meeting of the Vienna Otological Society in the autumn of 1913, at which I was present, a case of hysteria which gave a point-error, and at operation, of course, no disease of the cerebellum was found. Neumann reported three cases of lues, with transitory deviation of the pointing reaction. There was no spontaneous error present, and when experimental nystagmus was produced, there was still no error. Later the reactions became normal. One should only assume that there is destruction of a part of the cerebellum where repeated examinations give a spontaneous error of deviation and experimentally show an absence of the reaction in the opposite direction. The definitely localized centres are in the semilunar, superior, and inferior lobes and in the biventer.

A COURSE of lectures in sanitary science and hygiene is being given by the Royal Sanitary Institute at Vancouver. The purpose of these lectures is to train men and women so that, if martial law were declared, they would be able to assist the military authorities in keeping the city and refugee camps in a healthy and sanitary condition.

THE MEDICAL PROFESSION OF ALBERTA AND THE DEFENCE OF THE COUNTRY

By Major Lorne Drum, M.D., D.P.H.

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LET us suppose that an enemy holding the naval supremacy of the Pacific seizes Vancouver Island and lands on the coast. What would happen? Alberta would become a frontier province with the mountains for a rampart; and the militia of the district would be mobilized in one or more convenient areas of concentration. But even before the troops would begin to pour westwards over the mountain passes, the toll that sickness, minor casualties and accidental injuries exact on every army would begin to show its effects in the usual proportion of non-effectives left behind under medical charge. Again, on arrival at the frontier and before a shot had been heard a similar crop would be ready for shipment back; for sick men are an emcumbrance and handicap to any army, and must not be kept at the front. Then the day of battle arrives and the firing line reaps its harvest and pays its penalty. The wounded lie where they fall. There is no help for them except that which can be afforded by those with them—their comrades, the medical officer of their regiments and the regimental stretcher bearers or first aid men placed at his disposal. Later on in the battle, as the area of conflict shifts, the regiments move on and the wounded are left behind with only such temporary aid and hasty relief accorded as time and circumstance may allow. The field medical unit—the field ambulance or cavalry field ambulance—now enters upon the scene and proceeds to collect, relieve, dress and temporarily shelter those casualties until they can be handed over to others for transportation back to the railroads, and back through the mountains, in train-loads to Calgary and other distributing points. The field ambulance cannot do this transportation work. It musy hurry on after thc firing line, collecting, relieving, feeding, placing in temporary shelters, and ever again hurrying on, keeping pace with the troops in front. Another organization must take up this duty of transportation and care for the wounded until it is effected. This is the work of the clearing

hospital organization, and there is no such unit in Alberta. Again, when at last the wounded arrive at the railways, cars have to be fitted up for their reception and a personnel provided either from the clearing hospital or elsewhere to nurse and care for them during their long trip through the mountains and across the prairie. As the ambulance train rolls along on its slow course homewards, opportunities occur as the train stops at various railway stations for an organized local personnel to provide hot food, fresh clothing and other comforts for the wounded, as well as a few hospital beds in readiness for patients too ill to journey any farther. These rest stations are most important, not only along the line of rail travel, but at the various points of destination where ambulance trains will have to wait for hours before the unloading of the wounded and their allotment to hospitals—stationary hospitals—may be effected.

These stationary hospitals would have to be improvised at convenient centres in the province, suitable buildings such as schools and factories being requisitioned. In this connexion it is doubtful whether the civilian hospitals of the province would be even partially available owing to the fact that the accommodation needed in them after the civilian demands had been supplied would be far too small for the purpose. Only their operating rooms, *x*-ray apparatus, etc., could be counted upon for continued service. The personnel to take charge of these stationary hospitals would also have to be organized, as at present there are none. But the story is not yet complete. The sick and disabled have arrived at a stationary hospital, possibly at Calgary. They have reached the zone of distribution. They must here be permanently treated and cared for until distributed to the best advantage. Some may never so recover as to be effective fighting men again, or may require such time to do so as to render such an eventuality tedious or even problematical. These must be shipped farther away from the line of activities, as soon as their condition permits. Congestion must be avoided, and the burden evenly distributed throughout the zone. So from this point of distribution new train-loads of non-effectives leave for suitable points at which other stationary and auxilliary hospitals, and even large general nospitals may be located. A general hospital, for instance, might well be located at Medicine Hat, to serve the stationary hospitals located at such distributing points as Calgary and Lethbridge. Again, around Calgary, Lethbridge, Edmonton and any other points of distribution, auxilliary hospitals would be organized at suitable places such as Lacombe, Red Deer,

Wetaskewin, High River, Pincher Creek, Macleod and other points, within easy reach by rail or road. Along these railways and roads other rest stations would be required. In this way, those disabled for long periods of time would be distributed over the province, leaving clear for further eventualities the medical resources in immediate touch with the area of active operations.

Again, we have the disabled who, after the final operation or work of repair has been completed, require little or no further medical care, but only rest until once more efficient. For these non-effectives convalescent depots must be improvised at which, under medical supervision, they await their early return to duty. Such depots could be established in connexion with the general hospital at Medicine Hat, and also at Banff and other suitable places. All these and other medical formations must be improvised on the outbreak of hostilities, as only those organizations which would be immediately required to accompany the fighting troops into the field on the call to arms, namely, the regimental medical personnel and the field medical units, are organized and trained during times of peace. Even these units are trained on a limited establishment and would have to be increased to more than double their peace strength on mobilization. The country cannot afford to do any more.

Now, how is it proposed to improvise these and other equally essential organizations? We depend upon the local medical profession and other medical resources of civil life for this work. The officers will be supplied from among the practitioners, the nursing sisters from among the trained nurses, and the rank and file—the subordinate staff, both men and women—from among those who have received instruction in first aid, home nursing and invalid cooking at such classes as are held by our *confreres* under the auspices of the St. John Ambulance and similar organizations. In order to properly prepare the medical profession for this national duty—their share in the defence of their country—every endeavour is made to encourage the licensed practitioners of Canada, who are British subjects, physically fit, and under the age limit, to become medical officers of the militia. Those so eligible may apply for and receive a commission in the Army Medical Corps. Once upon the regimental list of this Corps they receive training in the duties of a medical officer, and are taught the rôle, sphere of action and organization of the various military medical formations above enumerated. In this way it is hoped that in due time every medical man in Canada, with but few unavoidable exceptions, will be a

trained medical officer, ready, when the time comes—if not already detailed to the medical charge of a regiment, or to a field medical unit—to improvise, staff and equip these other medical organizations from clearing hospitals to convalescent depots. Similarly, the large numbers of nursing sisters required must be supplied from the trained nurses of the country; and, to this end, every trained nurse who is a British subject, and otherwise properly qualified, is eligible for appointment to the regimental list of the militia Nursing Sisters.

Then for the rank and file—the subordinate personnel, how are we going to supply the large number of trained people required to complete the existing field medical units up to war strength, and to staff the many medical formations described? This is a very important question. All Canadians between the ages of eighteen and sixty are liable for service on mobilization in varying degrees, and for this purpose they are divided into four classes. Those in the first class would be those first called out, and those in the fourth class, last. The rank and file required for the medical organizations would be selected from among those mobilized militia men who have not already received a military training during peace time in other branches of the service, and who hold certificates from civil sources in first aid, hospital duties, home nursing or invalid cooking. In this connexion it can readily be understood that the teaching work of such organizations as the St. John Ambulance Association is of great importance, and from the patriotic standpoint of national defence alone it should receive our every support. The more such classes are held the greater will be the supply of trained citizens available for our needs on mobilization. But a difficulty still exists. What about those citizens, so trained, who belong to classes not called out? These certificated people are scattered all over the country, but, once trained, soon pass out of touch with the civilian bodies by whom they were taught. In the hour of national emergency the services of these people would largely be lost unless some scheme were adopted to keep track of them, and to utilize their voluntary services. To overcome this difficulty, a Voluntary Aid Committee is being appointed in each military division and district, whose duty it is to organize these trained individuals into Voluntary Aid Detachments—both men and women detachments—which will be duly registered, numbered, and annually inspected by the militia medical authorities. These detachments will be available on the outbreak of hostilities for duty in their home localities, if situated in the zone of distribution, to organize auxilliary

hospitals, rest stations, etc.; or when supported from private resources, such as by the Canadian Red Cross Society, to staff other medical organizations, such as ambulance trains and hospitals away from home. For further information as to the formation, training and registration of these detachments, I would like to refer you to the pamphlet on this subject issued by the Militia Department and entitled, "The Organization of Voluntary Medical Aid in Canada."

In conclusion, this is but a brief outline of the method by which it is proposed on the outbreak of a war of national defence to extend the present incomplete militia medical organization into a complete medical service capable of coping with all the essential details of a rapid evacuation and an efficient care and distribution of the casualties which will begin accumulating before even a shot is fired. Whether this extension may be accomplished readily and promptly will depend largely upon the way in which the medical profession in civil life understands and is prepared to carry out its share. Otherwise, all unorganized and individual effort—no matter how fervid and patriotic—can only result in hopeless confusion. In the absence of any proper medical arrangements behind the fighting troops, the armies will become overburdened, clogged and weakened by the pressure of sick and wounded; and not only will much unnecessary suffering and mortality ensue, but the fate of the country may be decided—like that of the Balkan armies before the Tchataldja lines—not by the strength of the enemy, but by the weakness of its own medical service. Therefore, the importance of a well organized and complete medical service in the day of national emergency cannot be overestimated, and the main factor in the provision of such a service in this country is the efficient and active coöperation of the medical profession as a whole. It is their share in the duty of national defence.

NATIONAL DEFENCE AND THE MEDICAL PROFESSION

By S. W. Hewetson, M.D.

Major, Army Medical Corps, Calgary

WE in Canada are very fortunately situated, for while the older countries are living in a state of armed neutrality, and while their inhabitants are struggling under the burden of an excessive tax for the maintenance of their armies and navies, we have shirked our responsibilities, and instead of aiding the Mother Country we have devoted all our time, all our energies, and all our revenues towards personal and national aggrandizement. Sooner or later, and, if we wish to maintain—I am tempted almost to say *regain*—our national self-respect, it will have to be soon, we will have to take up our share of the burden, and the first step towards this end is the establishment of a sufficient force to protect ourselves from outside attack. With a population of eight millions, should the fate of the Empire be at stake, surely Canada should be able to put a quarter of a million men in the field—approximately three men for every hundred inhabitants. This would mean a force of about fifteen thousand for Alberta, for the medical care of which ninety surgeons would be required.

"It is the patriotic duty of every able-bodied practitioner in medicine to so prepare himself in times of peace that should the nation ever call on him for service in the field he will be prepared to render valuable services, wherever placed, in a medical capacity. Experience has shown that the civilian surgeon, no matter how skilful a diagnostician and operator he may be, does not prove a useful military surgeon immediately after assignment to duty. This is due to lack of familiarity with military organization and surgical conditions as they present themselves on the battle field, on the lines of communication, and in the immediate rear of the army." *

In the first camp I had charge of, there were only one hundred officers and men all told, among whom there occurred a heavy

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Read at the annual meeting of the Alberta Medical Association, Medicine Hat, July, 1914.

*Extract from "The Military Surgeon," by Capt. S. M. Blech, U.S. Army Medical Corps.

epidemic of diarrhœa, and four cases of enteric after camp, a higher morbidity—not a higher rate of morbidity—than has occurred in subsequent camps of one thousand and more over which I have had medical supervision. Of course, I was younger then, and less experienced, but it must be borne in mind that I was probably an average example of the raw material from which we would obtain our recruits in the medical service. In order to appreciate the difference between civil and field surgery, it must be borne in mind that every war represents a "traumatic epidemic." The casualities may be enormous in number for certain periods and localities, or even throughout the entire "front," hampering the movements of the combatants. The medical service is not only charged with the treatment of the individual sick or injured soldier, but is entrusted with the duty still more important—from a strategic point of view—of removing the incapacitated to the rear, the so-called evacuation service. Humanitarians consider the care of the sick and wounded the most important duty of the army medical service, sanitarians the prevention of disease, strategists the removal of the wounded to the rear, or their prompt return to the firing line when only temporarily disabled—the so-called "evacuation and replenishment service."

Surgical therapy must not conflict with this last-named service. In fact every consideration is but secondary to the main purpose of winning the battle. The will of the commanding general is supreme. War is synonymous with great personal sacrifices upon the altar of patriotism. The surgeon, as will be seen later on, must save life whenever and wherever possible, but in a manner prescribed for him by higher authority. Except in home territory, safe from contact with the enemy, individualization, the pride and glory of the scientific surgeon in civil life, is out of place. The massive, or, if you please, "wholesale" character of the injuries to be treated requires a "wholesale" system of attention—"pattern-like," if need be.

If we further consider that the injuries encountered on the battle field are of a nature not met with in time of peace, arms and projectiles differing considerably from the revolver and rifle handled by civilians; if we further realize that ofttimes the surgeon may find himself handicapped by the absence of such equipment as he has come to look upon as essential for successful work in his office, dispensary or operating room, we will realize that there must exist some difference also from a purely technical standpoint.

The military surgeon contented himself in early days with the

care of the sick and wounded, but with the advance of medicine, and especially of preventive medicine, these functions have been extended to include all matters pertaining to the preservation of the health of armies, so that in addition to their entire care, when ill or wounded, the military surgeon has now to deal with all matters pertaining to sanitation and hygiene of the well. *In pace para bellum* is capable of extension to, "in times of health, prepare for sickness." The duties are extremely complex and technical and require a thorough knowledge of administrative details, and differ from those of the civilian surgeon in many respects. The civilian surgeon has usually only to attend to the medical or surgical aspect of his case; his patients being housed in the hospital or at home, where all details of shelter, food and clothing are provided for. The military surgeon has in addition, a multitude of details to attend to, viz.; food, shelter and clothing, medicine, drugs and attendance, transportation from the battle field to the field hospital, and thence to the base hospital. In addition, he has to maintain discipline, attend to the pay of patients and attendants, and is responsible for the condition of the hospitals under his charge and for their medical equipment. No matter how high his professional standing in civilian life, he will prove a lamentable failure as a military surgeon unless he also possesses executive ability and adaptability of no mean order. Even these qualities will not render him an efficient officer, unless he has acquired the technical knowledge of administrative details, relating to the obtaining of supplies, shelter, transportation and attendance.

Finally, unless he is versed in the methods of preventive medicine, he will not be able to give proper sanitary advice, nor to supervise the general sanitation and hygiene of troops. Inefficiency and incompetency in the medical department may have disastrous and far-reaching results, and may be important factors in the ultimate result of the war itself. In the Spanish American War, the States suffered heavy losses at the camps of organization and mobilization from the inroads of eruptive and enteric fevers—all preventable causes, due to the lack of training of their medical service. This alone might have led to their ultimate defeat had the combatants been more evenly matched. As a converse illustration, the success of Japan in the war with Russia was largely contributed to by the high state of efficiency of their medical army service. The importance of attention to details is illustrated by the fact that the Russians were far more subject to wound infection than the Japanese. This was especially noticeable in the winter months, and resulted directly

from their paying less attention to personal hygiene and from the wearing of greasy woollen under-garments instead of cotton.

Now the object of both these papers* is to prove to you the vital necessity of observing that good old maxim, "In times of peace, prepare for war." As medical men, we can best serve our country in a professional capacity, but no matter how patriotic we are, we must have preliminary training.

It is quite within the bounds of possibility that the conditions outlined in Major Drum's paper may occur in our time. Every one of us would respond to the call to arms, and right at the onset of hostilities the maintenance of the health of the troops would be entrusted to us, troops largely composed of raw levies, unaccustomed to discipline and the sanitary regulations of camp life. Unless we have some knowledge of these duties, sickness and disease will exact a heavy toll, and as a result of medical inefficiency, men who are anxious and willing to fight for their country, will never reach the front. Instead, they will become a source of burden and expense to the country, and their disability a lasting reproach to the medical service. Major Drum has therefore consented to recommend that a School of Instruction for army medical corps officers be authorized to be held in Calgary next winter, provided that at least twenty men agree to take the course of twelve days training. Roughly speaking, there would be one hour in the early morning (6.30 or 7 a.m.) devoted to drill and instruction in field work, and an afternoon and evening lecture each day. The hours would be arranged to conflict as little as possible with our every day work. There is a small allowance for living expenses, and in addition, officers from outside points will be allowed their transportation expenses. It will not be long before the establishment of a cavalry field ambulance with headquarters at Edmonton will be authorized, and officers qualifying now will be in line for rapid promotion.

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*The reference is to Major Drum's paper (see page 881).

SEPTEMBER 23RD, 1914.—It is gratifying to note that, since the declaration of war, no less than fifty medical men in Alberta alone, have already signified their intention of taking this course, to qualify themselves as officers in the Army Medical Corps or to take command of Red Cross or St. John's ambulance units; the use of the last two is not confined to time of war only. Such organizations can render invaluable services in times of peace during any great national calamity—fire, flood, famine, or riots, the latest instance being at Dayton during the floods in Ohio.

ANTITYPHOID INOCULATION AT THE WINNIPEG GENERAL HOSPITAL

By Sydney J. S. Peirce, M.D.

At the meeting of the Manitoba Medical Association in Portage la Prairie in 1910, the question of antityphoid inoculation came under discussion. The writer then was able to announce that the routine immunization of the nursing staff of the Winnipeg General Hospital against typhoid fever had been commenced some months previously. The time since the institution of the procedure was then so short that he was unable to estimate from personal experience the degree of its value, but he promised to report progress at a subsequent meeting. It is therefore in fulfilment of this promise that this short communication is presented.

Antityphoid inoculation was in use in the Winnipeg General Hospital as early as 1909, but only among the laboratory staff. It had scarcely the status of anything more than the pathologist's fad. It was not until the spring of 1911, when the work of Richardson and Spooner in the Massachusetts General Hospital, and of Major Russell in the United States Army, had definitely established on this side of the Atlantic the value of this procedure, that it seemed justifiable vigorously to advocate its application to the entire staff of the hospital. At the request of the medical staff, the writer prepared data[1] which showed that during the ten years previous to 1911, an average of seven cases of typhoid fever per year occurred among persons working in the hospital. The lowest number in any year was three and the largest fifteen. The individuals most frequently attacked were the nurses in their first and second years of training, and the medical orderlies. The amount of time lost to the hospital on account of typhoid fever was equivalent to one person being off duty and supported at the expense of the hospital throughout the whole of ten years. In June, then, of 1911, the routine inoculation of the nursing staff was commenced and has proceeded ever since.

The vaccine is prepared in the hospital laboratory. The organism is the stock strain of *B. typhosus* which has been in use

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Read before the Manitoba Medical Association, June, 1914..

in this laboratory during the last eight years. Subcultures of this are made on large agar slants, and the growth of twelve to twenty-four hours emulsified in normal saline solution. An estimation of the number of organisms per cc. is made, and to the thick emulsion is added one-thousandth of its volume of commercial formalin. This mixture when tested at the end of twenty-four hours, is invariably found to be sterile. It is sealed hermetically in glass tubes and set aside for three weeks or more to ripen, as it is found that severe reactions are more likely to occur when fresh vaccine is used than when it is two or three weeks old. To be prepared for use, the stock vaccine is diluted with normal saline so that 1 cc. contains two thousand million organisms, and its sterility is re-tested. Of this vaccine three subcutaneous injections are administered, consisting of 0·25, 0·5, and 1 cc., at intervals of ten days each. It will be seen that this vaccine differs in two respects from that used in the British and the United States armies. In the latter vaccine the organisms are killed by means of heat, whereas in the Winnipeg General Hospital vaccine the organisms are killed by means of formalin without heat. It was observed by Colonel Sir William Leishman and others that with the heat-killed vaccines, unless considerable care is exercised to avoid overheating, the vaccine is liable to be relatively inert. The avoidance of all heat would therefore seem to be advisable. Major Russell[2] in a series of experiments on rabbits with vaccines killed by means of various antiseptics, found higher bacteriolytic values with the formalized vaccine than with any other form. He was, however, satisfied with the heat-killed vaccine then in use in the United States Army, and did not feel disposed to change. The writer is not aware of any institution outside of the Winnipeg General Hospital, and a few other hospitals supplied by it, in which the formalized vaccine is in use. The Winnipeg General Hospital vaccine differs also in its larger dosage. The routine in the British Army is to give two injections of five hundred million and one thousand million, respectively, in the United States Army, three doses, one of five hundred million and two of one thousand million. In the Winnipeg General Hospital the doses are five hundred million, one thousand million, and two thousand million. It is found in practice that the large final dose is quite well borne. The reaction from it is usually quite insignificant, even though the reactions from the first and second may have been severe. It is interesting to note this, as the individuals vaccinated are largely young women, who are presumably more liable to react than a robust male such as a trooper in the army.

It seems, however, that women and children stand vaccination well. The writer recently had opportunity to observe the effect of the vaccine upon children during a recent outbreak of typhoid fever in an orphanage in this city. The city health department decided to inoculate all the inmates, and seventy-six children and thirteen adults received immunizing doses. The children, nearly all being under twelve years of age, were given half the adult dose. Of the seventy-six children, only 16 per cent. gave any appreciable reaction. Of the thirteen adults, eight or 54 per cent. gave moderately severe reactions.

Since July, 1911, the value of antityphoid inoculation has been abundantly demonstrated. By its use typhoid fever has been practically eliminated from the United States Army,[3] and in the British Army in India reduced to an insignificant minimum.[4] The experience of a single hospital, therefore, can add little to the great fund of data upon which this demonstration is based, but nevertheless, since antityphoid inoculation has not yet been extensively practised in Western Canada, it is thought that the data accumulated during the last three years at the Winnipeg General Hospital with respect to this procedure, are of sufficient interest to warrant their presentation before this association.

From June 24th, 1911, to June 1st, 1914, four hundred and forty-five persons have received doses of antityphoid vaccine in the Winnipeg General Hospital laboratory. Of these two hundred and seventy-six were nurses and maids, and one hundred and sixty-nine medical students, orderlies, doctors, and citizens who have requested to be vaccinated. Among all these cases no typhoid fever has yet been reported, with a single exception. This was a nurse who about six months previously had received three immunizing doses. She contracted a low fever from which she recovered in about three weeks. The Widal reaction in her case was positive. But this is not diagnostic of typhoid fever in a vaccinated person. No blood cultures were made, but examination of the stool failed to reveal typhoid bacilli. It cannot be said that the diagnosis in this case was complete, but in the absence of any other diagnosis it is recorded as a case of typhoid fever. With this single exception no case of anything resembling typhoid fever has in three years been reported among these vaccinated individuals, all of whom have been actually or presumably exposed to typhoid fever.

Among the whole hospital staff during these three years there have been but three cases of typhoid fever. One is the case of

doubtful diagnosis that has been mentioned. The second was a case of an orderly who had declined vaccination. The third was a nurse, also unvaccinated. The last case is of a peculiar interest. The young lady had certain scruples, presumably of a semi-religious character, against vaccination, and as the treatment is not compulsory these had to be recognized. It is interesting to record that she was the only individual of her class who was not vaccinated. That she should be the only one to contract typhoid is at least a striking coincident.

CONCLUSIONS: Formalin-killed vaccine is of potency at least equal to that of heat-killed vaccine.

Full immunizing doses of antityphoid vaccine are well borne by young women.

By the systematic application of typhoid inoculation institutional typhoid can be eliminated.

References:

1. PEIRCE, *Can. Med. Assoc. Journ.*, 1911, i, 503.
2. RUSSELL, *Boston Med. and Surg. Journ.*, clxiv, p. 1.
3. RUSSELL, *Journ. A. M. A.*, 1912, 1331.
4. LEISHMAN, "Address," Toronto Academy of Medicine, 1914.

THE cornerstone of the new centre wing of the St. Boniface Hospital at Winnipeg was laid on August 16th, by Bishop Beliveau. The new building will measure 177×50 feet and will be seven storeys high; the cost will be about $250,000. The St. Boniface Hospital was first opened in 1870, and then consisted of a small frame building which could accommodate four patients. When the new building is completed, the capacity of the hospital will be from four hundred and fifty to five hundred beds.

SUBTROCHANTERIC FRACTURE OF THE FEMUR

By W. G. Anglin, M.D., M.R.C.S. (Eng.), F.A.C.S.

Kingston, Ont.

THIS brief note on the subject of the treatment of the above fracture is not submitted for the attention of the metropolitan surgeon of large experience, but more particularly for the practitioner who may have comparatively few opportunities of dealing with this form of injury.

In many cases fractures must of necessity be treated in the home, and cannot have the benefit of the skilled attention of the surgeon of a large city hospital, who probably, in the light of modern opinion and with the aid of well qualified assistants, would be influenced to treat this special form of fracture by the open method and secure the apposition of the fragments by a Lane's plate.

If we can secure equally good results without submitting the patient to operation and retention of the metal plate, I believe it is a consummation much to be desired. All surgeons are aware of the difficulty of securing a good result by ordinary traction apparatus in the case of a fracture of the femur just below the trochanters, because the displacement of the short upper fragment cannot be overcome by traction alone. The lower fragment must first be brought into line with the upper fragment by flexion and abduction of the thigh, and slight rotation outwards.

The main object of this paper is to emphasize the treatment of subtrochanteric fracture of the femur by the special splint known as Hodgen's, which while giving uniformly good results, at the same time minimizes the amount of surgical nursing required, and gives to the patient the utmost degree of physical comfort. The treatment can be carried out in the home without a special nurse under the supervision of the attending surgeon.

Under the heading subtrochanteric fracture we include all fractures occurring in the upper third of the shaft of the femur. Most of the cases under my observation have been due to direct

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violence. In one case simultaneous fracture of both femora occurred in a lad of fourteen years of age who fell in front of a threshing machine which was being drawn along the road by a traction engine. The Hodgen's splint was not used in this case, the left femur being treated by a double inclined plane with traction, while the right femur was plated. Another young man was struck by a swinging bucket in a mine and sustained a fracture of his left femur. In one case, that of a school boy aged twelve, the fracture was occasioned simply by his being pushed off the sidewalk by a companion.

In all the cases the usual displacement was found, namely, flexion, abduction and outward rotation of the upper fragment, while the lower fragment dropped backwards and was pulled upwards. The diagnosis in each case was confirmed by *x*-ray examination. The ordinary signs of fracture were well marked and there was shortening of the limb with marked eversion of the foot. Bruising and swelling of the thigh was very evident in some of the cases and treatment for a few days was directed towards the reduction of this swelling before making use of the permanent splint, the limb meanwhile being supported and kept at rest by means of sand bags.

The well-known principles underlying the treatment of fractures are, first, correction of the deformity by the reduction of the fragments and, secondly, fixation of the broken bone when the fragments are placed in apposition by suitable retention dressings and apparatus until bony union has taken place. Treatment by Buck's extension and long T-splint is utterly unsuited to this form of fracture, as there is very little control over the upper fragment. The lower fragment must be brought into line with the upper fragment, and to do this and retain the fragments in apposition I know of no splint which is so admirably adapted for the purpose as Hodgen's.

Hodgen's splint is a metal frame made to suit the individual case and may be obtained from any competent blacksmith who will follow the instructions of the surgeon. It consists of two parallel bars preferably of three-eighths inch steel conforming to the width and length of the injured limb, and bent at a point corresponding to the knee joint. These bars are connected at the lower end about six inches below the sole of the foot by a straight bar, and at the upper end by a curved bar elevated a few inches above the groin and parallel with Poupart's ligament. So that the splint may be suspended, a pair of hooks is placed on the bars about midway

between the groin and knee, and another pair between the knee and ankle. Strips of flannel, or preferably canvas, about four inches wide are attached by being stitched to one of the bars, and adjusted by safety pins to the opposite bar so as to form a sling or hammock to comfortably support the limb. The ordinary Buck's extension strips of adhesive plaster are placed on the limb, the strips extending well up to the upper end of the lower fragment. The degree of flexion of the thigh is regulated as required to secure apposition of the fragments by the length of the canvas strips supporting the thigh. The extension cord from the spreader below the foot is to be fixed to the lower bar of the splint, thus making the necessary extension when the limb is suspended.

Before placing the limb in the splint, an anæsthetic is administered to the patient and four coaptation splints are carefully adjusted to the thigh while an assistant, grasping the leg and foot, makes the necessary extension and flexion. Gooch's splinting or poroplastic felt is used for this purpose. The anterior and posterior splints are bevelled to fit the groin and buttock respectively and extend to just above the knee, and internal and external splints of appropriate length are applied. These splints, properly padded, are held in position by strips of adhesive plaster.

The limb is then placed in the Hodgen's splint and the canvas strips pinned in position. At the foot of the bed, which is raised on six inch blocks, an upright bar is attached with a pulley about six feet above the bed from which the splint is to be slung. Cords are attached to the hooks at the sides of the splint and lead to a pulley, and from this another cord passes over the pulley on the upright bar. This latter pulley is arranged to one side so that the limb is abducted and rotated outwards. The obliquity of the supporting cord should be from 15° to 30°, and this obliquity can be altered by changing the position of the patient's body in the bed. The cord is attached to the foot of the bed after passing over the pulley. Fracture boards should be placed under the mattress. The leg should swing clear of the mattress, the patient's heel being a few inches from the bed.

This arrangment gives the patient the greatest degree of comfort. There is no restriction to the body as the splint accommodates itself to changes of position and the semi-recumbent position may be assumed without disturbing the apposition of the fragments. The bed pan may readily be adjusted from the sound side with the greatest of ease and without causing the patient any inconvenience. This splint may be used for all fractures of the

shaft of the femur except at the extreme lower end, but particularly for fractures of the upper end.

Union takes place early. Rapidity of repair was characteristic of all the cases treated. In several cases within a fortnight of the application of the splint, the great trochanter was found to move in unison with rotation of the whole limb, showing that a certain amount of union had taken place in that time. The splint, however, was retained in all cases for eight weeks, and then the patients were allowed to move about on crutches, The favourable results obtained seem to me to justify calling attention to the employment of Hodgen's splint for the treatment of these fractures.

Discussion

Dr. C. L. Starr: Regarding the treatment of fractures of the upper third of the thigh in young children, we find that the reduction of the fracture in the *x*-ray room, taking a skiagraph before and after, with application of plaster of Paris from nipple to toes, gives us the best result. After the application of the plaster the patient is placed on a modified Bradford frame with an opening at the pelvis. This is carried on cross bars above the level of the bed.

Dr. F. N. G. Starr asked Dr. Anglin the object of the coaptation splints. Personally he could see no object in their use. His objection to all kinds of fancy splints was that so much attention is given to the proper application of the splint that the necessity of reducing the fracture is overlooked. He had abandoned the splint described because of the impossibility of getting efficient extension.

Dr. Anglin fully endorsed the remarks as to the treatment of these fractures in young children. He only advocated the use of Hodgen's splint in the case of adults. Regarding Dr. F. N. G. Starr's question, Dr. Anglin replied that in the treatment of fracture of long bones the use of coaptation splints was so obvious that comment was unnecessary. Hodgen's splint was not a *fancy* splint, but one that could be readily made by any blacksmith, and the perfect results obtained in Dr. Anglin's cases was sufficient proof to him that efficient extension was secured.

The actual application of the splint was illustrated on a patient with suppositious fracture.

Case Reports

A CASE OF TETANUS, WITH RECOVERY, TREATED BY CARBOLIC ACID INJECTIONS

MALE patient, F. B., aged eighteen, coloured, teamster, admitted to the Toronto General Hospital, September 30th, 1913. Family and personal history unimportant.

Present Illness: On Saturday, September 13th, which was a half-holiday, he was watching a game of baseball and happened to be wearing the stockings which he had worn all week in his stable duties, and a pair of thin-soled shoes which were not worn in his ordinary duties about the stable. As a result of some remarks which gave offence in the progress of the game he was chased, and, in hastily climbing a fence, he set his foot on the top of a small hydrant with a square brass tip which, as he vaulted over the fence, penetrated the sole of the boot and injured the foot. The injury to the foot kept him from work, and four or five days later, as a result of some slight festering, he was able to take out from the wound a portion of the sole of the boot and a fragment of the sock. There was little suppuration, but much induration and tenderness which kept him from work, until, on the thirteenth day, he noted a slight stiffness of the muscles of the neck and the jaw and some difficulty in swallowing, so that on one occasion his jaws came together, biting the inner side of his cheek. On the fifth day thereafter he was admitted to the hospital.

Condition on Admission: Little or no fever; the whole course of his illness was practically without fever. General muscular hypertonus, amounting to slight rigidity; no convulsions or opisthotonus; plantar reflexes normal; other reflexes heightened; lumbar puncture caused general spasticity and tension of muscles, especially of the limbs, but no convulsions; the spinal fluid showed very little opalescence; Noguchi and ammonium sulphide tests negative; Haines solution slightly reduced; the microscope showed fifteen cells per c.mm., mostly polymorphonuclear. A few hours after admission he was given, under chloroform, 10 cc. antitetanic serum (B. and W.) into the spinal canal. October 1st, very severe

headache, causing the patient every three or four minutes to cry out. The wound was freely incised, thoroughly swabbed out with pure carbolic acid and dressed with bichloride compresses. Smears from the wound gave *B. tetani*. Cultures were not so successful, from contamination. The second dose of 20 cc. antitetanic serum was given under chloroform sixteen and a half hours after the first dose. The headache continued to be very severe for another day. Chloral hydrate, 10 grs. and potassium bromide 20 grs. were given every four hours. No more serum was administered, but on the day after admission, beginning on October 1st, the following course of carbolic acid injections was given hypodermically, and note was made simultaneously with regard to the white cell count and the effect of the drug upon the urine.

Synopsis of carbolic acid injections, alternating (1) in the left pectoral region, (2) right pectoral region, (3) left thigh, (4) right thigh, and so on, with the white cell count taken at time of each injection. Each injection consisted of pure carbolic acid and glycerine of each one drachm. Leucocytes on admission 7,600.

Injection.	Date.	Hour.	Leucocytes.
First.....	October 1	11 P.M.	13,125
Second.....	October 2	4 A.M.	16,000
Third.....	October 2	8 A.M.	20,900
Fourth.....	October 2	2 P.M.	18,750
Fifth.....	October 2	11 P.M.	21,250
Sixth.....	October 3	8 P.M.	21,875
Seventh.....	October 4	9 A.M.	20,500
Eighth.....	October 4	8.30 P.M.	24,000

No further injections were made, but the white cell count was made morning and evening until October 9th, after which it was made once daily:

No injection.....	October 5	9 A.M.	23,000
		8 P.M.	20,250
No injection.....	October 6	8.15 A.M.	19,225
		8 P.M.	17,500
No injection.....	October 7	9 A.M.	17,500
		8 P.M.	16,000
No injection.....	October 8	9 A.M.	13,250
		6 P.M.	12,210
No injection.....	October 9	.....	12,600
No injection.....	October 10	.....	13,800
No injection.....	October 11	.....	9,400

URINALYSIS CHART

Date	Reaction	Spec. Gravity	Albumin	Sugar	Microscopic	
Sept. 30...	Alk.	1020	No	No	Phosphates. epith. cells, debris.	
Oct. 1...	Alk.	1018	No	No	Phosphates. epith. cells, debris.	
Oct. 2...	Alk.	1022	No	No	Few R.B.C.	No Carboluria (tested with F_eCl and bromine water).
Oct. 3...	Acid	1035	No	No	Few R.B.C.	No Carboluria
Oct. 4...	Acid	1032	No	No	Few R.B.C.	No Carboluria
Oct. 5...	Acid	1030	No	No	R.B.C.	No Carboluria
Oct. 6...	Acid	1028	No	No	R.B.C.	No Carboluria
Oct. 7...	Acid	1022	No	No	R.B.C. few	No Carboluria
Oct. 8...	Acid	1020	No	No	R.B.C. few	No Carboluria
Oct. 9...	Acid	1020	No	No	R.B.C. none	No Carboluria
Oct. 10...	Acid	1018	No	No	R.B.C. none	No Carboluria
Oct. 11...	Acid	1018	No	No	R.B.C. none	No Carboluria

No casts at any time.

The local results of these injections were very marked tumefaction and tenderness, so that the parts looked as if they must break down with sloughing. Within a few days, however, complete local recovery had occurred and practically no damage whatever persisted. Two other facts may be noted: (1) The complete immunity of the kidneys from the damage that would inevitably have resulted if carbolic acid in these amounts had been swallowed, leaving out of consideration the injury to the stomach, which would follow on very much smaller doses if given by the mouth. (2) The stimulating effect of the drug upon leucocytosis. It will be noted that the white cell count which began at 7,600 did not fall to that level or near it until a full week had elapsed after the last dose was given.

Convalescence was rapid and uneventful. Local lesions due to the injections had all disappeared by the eleventh, or one week after the last injection, all rigidity of muscle had gone and the patient was discharged, cured, in a few days.

I do not of course claim that this happy result was solely due to the treatment, but it shows clearly that the treatment is at least innocuous, and would appear to be a distinct addition to our means of combatting one of the most dreadful of all the acute infections.

There are four diseases which have been shown by modern research to be at least first cousins etiologically, though clinically they are so diverse. They are: shingles, rabies, tetanus and acute poliomyelitis. The toxins of these diseases are alike in their fatal selective influence upon the nerve tissues. The infection in tetanus is purely local. The toxins, continuing to be produced at the original focus, slowly produce their symptoms, during a period which has wrongly been called one of incubation, by combining with the axis cylinders of the motor nerves leading from the wound, with which nerve substance they combine to form a new compound of great chemical stability. The poison does not spread, according to the authorities, by the lymphatics and vessels of the nerve sheaths, but when it has slowly combined as above stated with the medullary substance of the nerve trunks, and has thus reached the cord and anterior horn, or basal ganglia in wounds of the head, symptoms begin to appear. This probably explains, at least in part, why tetanus infection of head wounds is so much more rapidly fatal, while wounds further away take longer to produce symptoms —in this case thirteen days. Even so long ago as the time of Hippocrates it was stated in one of his aphorisms that "such persons as are seized with tetanus die within four days, or if they pass these they recover." The severity, and usually fatal ending, in cases of head wounds has caused some physicians to speak of these as "head tetanus," and in some cases they have been confounded with hydrophobia on account of the severity of the convulsions and the difficulty of swallowing. It would seem, too, that the serum, though admittedly protective if used early, cannot be called curative. Its use, therefore as a prophylactic in the case of wounds in which tetanus infection is possible is rational and should be urged upon the profession. The costliness of the remedy makes it advisable that boards of health should provide it, and that great industrial concerns whose employees are subject to such injuries should provide it for their surgeons, and should be required to use it in every case where tetanus is possible. The considerations above mentioned, however, make its use as a curative measure after the development of symptoms uncertain, and in practice it has been found actually disappointing. The prophylactic dose is from 500 to 1000 units given at once, followed by a second, perhaps larger, dose in ten days. Even after symptoms have occurred, however, it would be sound practice, after thoroughly opening the wound and swabbing it with pure carbolic acid, to infiltrate all the surrounding tissues with the serum so as to neutra-

lize the toxins present in the focus of infection. Some authorities recommend a similar infiltration of the nerve trunks leading from the wound, which would be quite possible in the case of the larger nerves at any rate, and intraspinal injections are also probably rational as neutralizing toxins which have not yet entered into combination with nerve tissue. Other measures, however, may not be neglected, and of all the many nerve sedatives which have been used chloral and its bromides seem to remain the most useful. I need not refer to the necessity of rest, seclusion, skilled nursing and the avoidance of everything which tends to startle, or bring on a spasm. Even feeding may have to be done under chloroform by the stomach tube. In severe cases profuse sweating is usually seen from the muscular exertion involved in the convulsions which are, if severe, to be controlled by chloroform, and morphine will also be found to be of great value.

I do not, however, wish to weary you with a digression upon the subject of tetanus in general, but rather to show you the possible advantage of what seem enormous doses of carbolic acid, and particularly their harmlessness in any event. So far as I am aware the credit of the introduction of this method of treatment must be given to the late Dr. George A. Peters, who saved the lives of at least two desperate cases in the Toronto General Hospital a few years ago. Seeing that they were about to die, if unrelieved, he called upon the experience of the veterinary surgeon of his regiment, the 9th Mississauga Horse, Captain S. C. Macdonald, who had shortly before successfully treated tetanus in some of the horses at camp. Dr. Peters learned from Macdonald the doses he had given to the horses and the approximate weights of the animals and figured down his doses in proportion to the weight of his human patients. He found to his surprise that, given in this way, the drug was not deadly, and I think distinctly added to our armamentarium. I am free, however, to admit that my patient showed from the outset, apart from treatment, the three most favourable prognostic points of tetanus: the long interval (thirteen days) between the injury and onset of symptoms; the non-febrile course, and the limitation of the symptoms to the neck and jaw, so that I must ask you to clearly understand me as not attributing his recovery necessarily and wholly to his treatment by carbolic acid injections.

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University of Toronto.

Editorial

THE CANADIAN MEDICAL SERVICE

A VISIT to the mobilization camp at Valcartier is an impressive experience. At the time of writing the early departure of the first expeditionary force from Canada is expected. All the volunteers have been thoroughly examined and more than thirty thousand have been found medically fit. That the health of the troops has been so exceptionally good, must be ascribed in large measure to the thoroughness and intelligence with which the medical and sanitary corps have carried out their duties. There has been scarcely any serious illness. Pneumonia has been surprisingly rare, and not a single case of typhoid fever has originated in the camp. The water, which in its natural state was unsafe, is carefully chlorinated, and the supply is lavishly distributed throughout the vast extent of the camp. The inoculation against typhoid has been thoroughly carried out. It has aroused wide public interest and has called forth some criticism in the press. The judgement, however, of some of those whose opinion on the matter is worth having, is that there has been no undue proportion of severe reactions. In no instance has inoculation given rise to any serious symptoms.

The following is a list of about one hundred and twenty medical officers who have been on duty at Valcartier, and who are going to the front with the first contingent:

Lieutenant-Colonels: J. W. Bridges, P.A.M.C., K. Cameron, G. L. Foster, P.A.M.C., D. W. McPherson, J. W. Shillington, C. F. Wylde, Murray MacLaren.

Majors: C. C. Bell, D. B. Bentley, E. R. Brown, R. P. Campbell, J. T. Clarke, C. E. Doherty, H. C. S. Elliott, F. S. L. Ford, J. E. Gunn, E. B. Hardy, A. S. Langrill, E. A.

LeBel, G. S. Mothersill, McKenzie, John McCrae, S. H. McKee, W. T. M. McKinnon, R. Raikes, G. P. Templeton, F. L. Vaux, P.A.M.C., W. L. Watt, E. J. Williams, R. P. Wright.

Captains: F. E. Bell, P. G. Bell, W. Bethune, G. G. Boyce, P. C. Brown, A. A. Chisholm, P.A.M.C., J. C. Callhoun, E. C. Cole, Dillon, J. S. Duval, G. W. Dowsley, S. Ellis, C. G. F. Fortin, McKenzie Forbes, J. J. Fraser, J. C. Fyshe, G. H. R. Gibson, R. C. Geggie, Gauthier, G. G. Greer, Gilles, Goldsmith, Hollett, J. T. Hill, Leslie, T. A. Lomer, McGibbon, Morrell, H. E. Munroe, Morris, J. D. Morgan, A. D. McConnell, G. Musson, K. D. Panton, R. S. Pentecost, Phillip, P. Poisson, A. Rankin, Sommer, S. A. Smith, A. E. Snell, P.A.M.C., R. H. Sutherland, G. Shanks, F. A. C. Scrimger, J. H. Todd, W. H. Tytler, E. M. Vesey, Woodiwiss, E. A. Young, R. E. Wodehouse.

Lieutenants: Bennett, Burnham, G. Bauld, Burke, O. E. Carr, Chown, Colbourn, Cummings, Donaldson, F. E. Fox, Fisher, R. M. Gorsline, P.A.M.C., Haywood, A. L. Johnson, Jepps, H. B. Jeffs, F. McKay, McDonald, McDermott, J. H. McKillop, J. D. McQueen, H. J. Robertson, R. T. Rogers, G. A. Ramsey, A. E. Ross, Robson, F. S. Ruttan, E. L. Stone, F. F. Smith, E. C. Winsler, R. Wilson.

Each expeditionary force is to carry with it complete equipment for its base hospitals as well as for its field ambulances. No. 1 General Hospital, which will be situated in a large town far removed from the front, will have accommodation for over five hundred patients. The staff will consist of twenty-one medical officers and forty-two nursing sisters. It has been announced—and all the members of the Association will heartily approve the choice—that our president, Dr. Murray MacLaren, is to be in command. Drs. F. G. Finley and K. Cameron are to be in charge of the medical and surgical services, respectively. The rest of the staff also is largely recruited from the officers, past and present, of the Montreal General Hospital. Their names are included in the list given above. No. 1 Stationary Hospital, which will be a smaller

establishment situated nearer the front, will probably be in command of Major Drum, with Drs. McKee, Bauld, Morris, Johnson and Williams on the staff. Two similar hospitals will be sent with the next contingent, and it is expected that the staffs of these will be recruited chiefly from Toronto and the West.

Supplementing the work of the military athorities, several auxiliary organizations have been making active preparations. Notably the branches of the Canadian Red Cross Society have enlisted the practical help of the women of the country in the preparation of warm clothing for the troops and of medical supplies. It is announced that Col. Burland, well known for his work in the campaign against tuberculosis and for other philanthropic activities, is leaving for England to direct the work of the Canadian Red Cross. The funds raised by the women of Canada, primarily for a hospital ship which was found not to be needed, have amounted to the handsome total of $285,960, and have been transmitted to the Admiralty. Of this sum, $100,000 is to be given to the War Office, and the balance will be devoted to the establishment of a naval hospital near Portsmouth. The War Office has as yet no definite plan for the disposal of its portion of the fund, and it has been wisely suggested that a part or the whole of the money might appropriately be applied to the hospital which has been established by the Canadian War Contingent Association in London, and which is in need of funds. This hospital is to be known as The Queen's Canadian Military Hospital, and is for the general use of the king's forces. It was hoped that it might be opened early in October with fifty beds, ultimately to be increased to a hundred or more. The organization of the hospital was undertaken by Sir William Osler and Dr. Donald Armour, and was the outcome of an arrangement made by the Canadian War Contingent Association with the Army Council, through the Queen's Committee of the Order of St. John of Jerusalem, of which H.R.H. The Duke of Con-

naught is Grand Prior. The equipment and maintenance of the hospital for a year and the care of the sick and wounded during convalescence will, it is estimated, require at least $100,000. Of this not more than $55,000 has been subscribed by the end of September. The honorary treasurer of the association is Mr. G. C. Cassels, Bank of Montreal, London, E.C., to whom subscriptions may be sent.

THE HOSPITAL AND WAR

THERE is a well defined limit to the burden of charity which a community can bear. Under ordinary circumstances a city can care for its sick and poor, as an army can transport, and tend, its wounded. But to every army there may come a time when the wounded must be abandoned to their fate, so that the efficient may be saved.

In time of peace a civilized community discharges this obligation faithfully, though the charge is heavy. In a well equipped general hospital the over head cost for one bed is about eight dollars a day. This amount represents merely the interest, charge, and depreciation. In addition, the sustenance of the patient costs at least a dollar and a half a day. If medical attendance be reckoned, which it must be, although it is rendered gratuitously, five dollars more must be added. Every patient, then, who is received into a hospital costs the community nearly fifteen dollars for every day he remains in bed; that is, fifteen of his healthy fellow-men must work a full day for his support.

At the present moment the burden of war lies upon the community, and it must be borne. The men at the front are bearing it. Their wives and children must be supported. Incomes are impaired or destroyed. Many persons who in times past had a surplus for charity now find themselves hard pressed to provide the necessities of life for their families. We are face to face with the primitive truth that for the safety of the State, the well are more important than the sick.

Many hospitals are already partially closed, and some

will in due course shut all their doors. The stream of charity has been diverted, and there is no money in sight for immediate needs. In many cases the staffs are depleted. From the Montreal General Hospital eleven members have gone to the front, including Drs. Cameron, Finley, Wylde, Campbell, Forbes, McKee, Shanks, Cumming, Macdermot, Robson, and Ramsey. From the Royal Victoria, Drs. McCrae and Keenan have gone; and Dr. Birkett, dean of McGill medical faculty, is to follow shortly. It is a strange phenomenon, the sick of a large city being uncared for, but it brings to our very doors the hard reality of war.

THE MOMENT AND THE TELEPHONE

EARLY in September the physicians of Montreal received a communication from the Bell Telephone Company that the rate for their telephone service would be increased to fifty-seven dollars for a desk telephone. The present rate is forty-two dollars. In the communication referred to, the statement is made that this increase was "recently authorized by the Board of Railway Commissioners for Canada." This statement is incorrect. No such rate has been authorized at any time by any body except the Telephone Company itself. If the Telephone Company chooses to be technical it is open to the profession to be technical too.

An application from the company for permission to increase the rate to physicians was made to the Board of Railway Commissioners. The application was not made quite in that form. With a fine disingenuity it sought permission to discontinue "the reduced tolls previously granted to physicians," whilst in reality the tolls which they paid have always been higher than those exacted from other private persons who were not engaged in business.

The Medico-Chirurgical Society at once protested, and the protest was heard on January 5th, 1914, Dr. Armstrong appearing for the Society. The decision was given orally

by the assistant Chief Commissioner; authorizing a certain imposition, and those who are anxious to read the text will find it in volume ninety-four, page twenty-one of the report. The assistant Chief Commissioner made no pretence of going into the merits of the case. He merely referred to "a somewhat similar case," which was in no respect similar, in which an increase was granted by some one else. This was the case of Miss Bayly, of Toronto, and her rate was increased from the residence to the business rate. It was decided "that her telephone being used sometimes for business purposes was a business telephone, and the company was justified in charging a business rate." The Board of Railway Commissioners itself is one of those extra-judicial bodies which are growing up in our midst, and is itself only justified so long as it adheres to common-sense. It exists to control corporations, not to enable them to impose upon the public.

The residence rate is thirty-five dollars. If a telephone in a residence, "which is used sometimes for business purposes," thereby becomes automatically a business telephone, it is clear that all telephones are business telephones, since all telephones are used for that purpose. The man who summons a physician by telephone, who orders his coal or groceries, who speaks with a stock-broker, who enquires about the departure of a train, is transacting business, and so is amenable to the higher rate. It may possibly be that the company is entitled to exact from physicians a higher rate, but that right will have to be determined on other grounds than those already put forward.

Many things have happened since last January, and even if such a right were granted, the present is not the moment to put it in force. The hospitals are closing their wards for lack of support. The sick must be cared for, and the burden will fall upon the physicians in their private capacity. At the same time they are being called upon to treat gratuitously the families of those who have gone to the front. Ten per cent. of the physicians are actually serving in the militia,

which is exactly twenty times the proportion in the community as a whole; and it is not on record that the Telephone Company is suffering to the extent of a reduction in its dividends.

A great deal of top-hamper has come down. Things which were at one time considered necessities are now discovered to have been luxuries or burdens. It is wonderful how well people are getting along without opera, stock-exchanges, wines, and cigarettes. The telephone is in the same category. To physicians it is not an unmixed good. It puts him at the mercy of every hypochondriac within a radius of four hundred miles, of every woman who is suffering from ennui, and of every patient who wishes extra and gratuitous advice. If physicians only had the resolution to seize upon this imposition as a warrant for ridding themselves of the burden, they would be astonished at the peace and comfort which would come into their lives. Their fees would not be diminished, since patients who require their services will find ready means of making their wishes known. When physicians abandon the telephone on grounds of health and comfort, the public will soon follow their example, and the Company will then have nothing else but "business telephones."

AN EXPERIMENT IN TYPHOID

IT is always well to write down what one thinks is going to happen, if only to be sure how wrong one will be. For nine months we have been reiterating that Montreal was in peril of an epidemic of typhoid fever. On December 25th, 1913, the water supply failed entirely. For ten days the citizens reverted to the methods which were in vogue in the time of Maisonneuve for obtaining water. The break in the conduit was patched, but there was every probability that it would recur. To provide against this contingency connexion was made between the city mains and the Lachine canal by a seven-foot pipe.

The Lachine canal acts as a sewer for a stretch of country eight miles long and passes through a very thickly settled region. Vessels of all kinds pass up and down. Its banks are lined with factories, and open privies are established on its edge. In the spring, when the water is let out, human bodies and carcasses of animals are discovered on the bottom. We protested as urgently as we could, against the use of water from such a source, and foretold an epidemic which would make a record for modern times. The Medico-Chirurgical Society also protested against this water supply as an outrage. Deputations to the city authorities were not listened to, and for three days Montreal was made to drink sewage as an experiment. Nothing happened; but this was early in the season when typhoid is not normally prevalent.

The water from the canal was turned on again in August and for three weeks was the only supply. It was charged with chlorine; but no advice was given to boil it; although the city engineer did admit that there was no law to prevent the citizens from boiling their water if they so desired. These were the hottest days of the year. Nearly a month has now passed, and there has been no epidemic. The incidence of typhoid is about as in previous years. Either a miracle has happened, or there is something yet to be learned about water supplies.

It is from no spirit of chauvinism that future issues of the Journal, at least for a time, will contain no "Abstracts of German Literature." The conditions prevailing at present in Europe react in many ways, even in the sphere of medical journalism. The persons and institutions affected are many. They include various colleges and universities, which are unable to obtain literature of any kind from Germany. The professors are submitting with the grace that is born of necessity to the added labour involved in a complete re-organization of their courses.

DURING the past two months a harrowed world has been taught a new idea of the meaning of the word *Kultur*, always the most overworked term in the German language. Leaving aside the atrocities of which one reads daily, and which are not proved, the destruction of Louvain and of Rheims will fasten the stigma of brutality and vandalism upon this generation of Germans for ever. Both of these outrages concern us chiefly, indeed, as human beings, but also, to a less extent, as physicians. The university of Louvain has always been famed for its theological teaching, but it has also played its part in the history of our profession. Its medical faculty had existed for five hundred years or more and could boast of some famous names, especially that of the inventor of the word *gas*, the great seventeenth century chemist, van Helmont. The university may rise from its ashes, its ancient library will not. As for the cathedral of Rheims, if its historical importance and, above all, its own matchless beauty could not save it, it would be idle to expect its destroyers to spare it merely for the sake of a scrap of cotton with a red cross on it and of the wounded it harboured. This building was the masterpiece of the middle ages, and to many was the most beautiful thing ever wrought by the hand of man. "Louvain, Rheims! Even Attila, King of the Huns, the Scourge of God, spared the historic city of Troyes and its treasures of art, when Troyes fell within the area of *his* military operations." And for fifteen centuries he has been the prototype of the barbarian! *Delenda est Borussia.*

THE third annual meeting of the Alienists and Neurologists of the United States took place in Chicago, July 13th to 17th last, under the auspices of the Chicago Medical Society. The attendance numbered nearly one hundred and included official representatives from twenty-seven states. A special edition of the *Illinois Medical Journal* will be issued this month which will contain the papers read; and committees will be appointed in every state in the Union to bring before the governors and the legislatures the recommendations made at the congress.

Book Reviews

MODERN MEDICINE. Edited by SIR WILLIAM OSLER, Bart., M.D., F.R.S., and THOMAS MCCRAE, M.D. In 8 octavo volumes of about 1,000 pages each, illustrated. Volume III. Diseases of the Digestive System—Diseases of the Urinary System. Price per volume, cloth, $5.00 net; half morocco, $7.00 net. Lea & Febiger, publishers, Philadelphia and New York, 1914.

We hasten to record that the third volume of Modern Medicine has appeared. To Canadian readers nothing more is necessary than mention of the fact,—the editors and their work are so well known. In this volume especial interest attaches to the articles by John McCrae and Charles F. Martin. Dr. McCrae writes the chapters on Diseases of the Œsophagus, and the introduction to Diseases of the Kidney. Dr. Martin writes the chapter on Organic Diseases of the Stomach. The other contributors are Thomas Brown, Julius Friedenwald, A. E. Garrod, James Herrick, A. O. J. Kelly, Eugene L. Opie, William Pepper, David Riesman, H. D. Rolleston, Alfred Steigel, C. G. Stockton, H. H. Young. With two such editors as Osler and McCrae, and with so noble an array of contributors, the book could not be anything else than it is, the standard of modern medicine.

THE PRACTICE OF SURGERY. By JAMES G. MUMFORD, M.D., lecturer on surgery in Harvard University. Second edition, thoroughly revised. Octavo volume of 1,032 pages with 683 illustrations. Philadelphia and London: W. B. Saunders Company, 1914. Cloth, $7.00; half morocco, $8.50

It seems a very short time since we had the privilege of calling attention to the first edition of Mumford's "Practice of Surgery," and again we give it good welcome. There is a nice flavour about the writing and a personality, as if the man wrote the book himself, and did not produce it by a machine kept for the purpose. Dr. Mumford is no stranger to the reviewer. One is already familiar with his "A Narrative of Medicine in America," "Clinical Talks on Minor Surgery," "Surgical Aspect of Digestive Disorders," "Sur-

gical Memoirs and other Essays." In the beginning there is a nice tag from Religio Medici, and the preface contains some pleasant comment upon the author and his reviewers. The frontispiece, which is a reproduction of an old and a modern operating room, gives a striking demonstration of the difference between the old and the new. The book itself opens with a consideration of appendicitis, and this unconventional method is based upon a principle; for as the author assures us in the preface, he takes up the subjects in their order of interest, importance, and frequency, and lays stress upon those subjects to which nature herself has attributed importance. This is part of an attempt to present the various subjects in their true perspective, since appendicitis is of more concern to the surgeon than inflammation of Meckel's diverticulum, meningitis than cirsoid aneurism, and felon than Dupuytren's contraction. From this it will be seen that there is common sense about the book. It does not attempt to do more than can be done well; and what has been attempted has been well done.

MODERN SURGERY: GENERAL AND OPERATIVE. By J. CHALMERS DACOSTA, M.D., Samuel D. Gross professor of surgery, Jefferson Medical College, Philadelphia, Pa. Seventh edition, revised, enlarged, and reset Octavo of 1,515 pages, with 1,085 illustrations, some of them in colours. Philadelphia and London: W. B. Saunders Company, 1914. Cloth, $6.00 net half morocco, $7.50 net.

This noble work is dedicated to "the inspiration of one of the greatest, most progressive, and most influential surgical clinics in the world." The inspiration is W. S. Halsted, the clinic, Johns Hopkins, the world, the United States. The book is written as by one having authority. There is a pungency in it which is refreshing. The preface is a model of what a preface should be, and we can well believe Dr. DaCosta when he says he was in profound perplexity as to whether an alleged discovery was a fragment of external truth or merely an emanation of chaos. If he admitted all the alleged improvements of recent years, a reader could find "the productions of the mistaken enthusiast, of the brilliant confidence man, of the deluded observer, of the conscientious worker, of the dull pretender, of the man with occasional flashes of genius, of the profound scholar, and of the grandee of science." He has avoided this heterogeneous company, and has brought forward a considered and calculated book. It was from its first

appearance even a standard. In its revised form—for this is the seventh edition—it is a standard yet.

COLLECTED PAPERS BY THE STAFF OF ST. MARY'S HOSPITAL (MAYO CLINIC) FOR 1913 Octavo of 819 pages, 335 illustrations. Philadelphia and London: W. B Saunders Company, 1914. Cloth, $5.50 net

The Mayo clinic is one of the most extraordinary phenomena in modern medicine. Messrs. Saunders have issued a large volume of 819 pages, which is made up entirely of contributions from the staff of St. Mary's Hospital where the clinic is held. There are twenty-nine contributors, and the subjects with which they deal cover practically the whole range of surgery. One gets the impression in reading these reports of being very near to the thing itself. The voices seem to speak in unison, and give a considered judgement. There is a deliverance on every possible subject, which must carry weight in view of the enormous experience by which it is informed. For example: "The Roentgen-ray. . . . has no direct effect on cancer. Radium is still in the experimental stage. Its effect is probably similar to that of the Roentgen-ray." There is a wonderful freshness about the presentation of each subject, a freedom from traditional bias, and an obvious intention of viewing the facts in all their simplicity. This is the new world of surgery something like that new surgery which made the Greek schools famous.

A TEXT-BOOK OF MEDICAL DIAGNOSIS. By JAMES M. ANDERS, M.D., professor of the theory and practice of medicine and of clinical medicine, Medico-Chirurgical College of Philadelphia, and L. NAPOLEON BOSTON, M.D., professor of physical diagnosis, Medico-Chirurgical College, Philadelphia. Second edition thoroughly revised. Octavo of 1,248 pages, 500 illustrations, some in colours. Cloth, $6.00 net; half morocco, $7.50 net. Philadelphia and London: W. B. Saunders Company, 1914. Canadian agents: The J. F. Hartz Company, Limited, Toronto.

It is so short a time since the first edition of this book was reviewed in these pages, that it is unnecessary to return to the subject at any length, excepting to say that any advance in the method of diagnosis, which has been achieved since that time, has been carefully considered and noted. All the im-

portant signs and symptoms of any given disease are classified together, and can be readily grasped. There are brief pathological descriptions. Illustrative cases are set forth, and comparative tables are freely used to demonstrate the distinction between clinical conditions which might at the first view be considered as closely allied or even identical Dr. Anders has employed a somewhat similar method in his work on medicine, and in the present case it will doubtless find equal appreciation. The book has grown to 1,248 pages, and in such a volume of writing nothing very important can have failed to be recorded.

THE ILEO-CÆCAL VALVE. By A H. RUTHERFORD, M.D. Price, 6s. net London: J. K. Lewis, 1914

Dr. Rutherford, now of Sydney, presented a thesis for a degree to the University of Edinburgh upon the ileo-cæcal valve, that is, the orifice between the small and large intestines and the structures adjacent thereto. This thesis now appears in the form of a book which is issued by Mr. Lewis. Even a small book may deal with a small subject very thoroughly, and this one does so. The plates are numerous and very clear. If will be a long time before any anatomist will think it necessary to investigate further this part of the anatomy.

PRACTICAL PEDIATRICS A MODERN CLINICAL GUIDE IN THE DISEASES OF INFANTS AND CHILDREN FOR THE FAMILY PHYSICIAN. By JAMES H MCKEE, M.D. and WILLIAM H. WELLS, M.D. WITH APPENDIX UPON DEVELOPMENT AND ITS ANOMALIES. By JOHN MADISON TAYLOR, A.M., M.D. Illustrated, Volume 1 and 2. Price, $12.00 net. Philadelphia: P. Blakiston's Son & Company, 1914.

The present reviewer is bound to confess that he cannot get very far with a book which contains in the preface such words and phrase as damagement, eugenics, communal encouragement, contemporary findings, conditioning the buddings of human life forces, paramount, incipience of acquired abnormalities, concrete entity, conservators of health, conservation of infants, the foreground of their purpose. The writing in the book itself is more human; but there is too much "it is said," "probably"—"some authorities . . . other authorities." There is no finality of opinion expressed on the reaction of a woman's milk. We are merely told what Holt "contends," "though most authorities state that it is

fairly alkaline." For a book of such magnitude—two volumes making nearly 1,200 pages, it would be possible, one would think for at least one of the three authors to get a little phenol-phthalein—not phenophthalein—and make the test for himself. Also, we could well be spared so sententious an expression as this: with modern knowledge, mothers may make of maternity a noble profession. When they speak of a wet-nurse as "a czar," we must protest on behalf of our great Ally. In spite of these obvious defects the book is not to be too lightly regarded. It must have cost the authors infinite pains, and they have approached their task with courage, and a large equipment of a professional kind.

THE PRACTICAL MEDICINE SERIES COMPRISING TEN VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY Under the general editorial charge of CHARLES L. MIX, A.M., M.D. and ROBERT T. VAUGHAN, Ph.B., M.D. Volume I, General Medicine, edited by FRANK BILLINGS M.S., M.D., and J. H. SALISBURY, A.M., M.D. Price, $1.50 Volume II, General Surgery, edited by JOHN B. MURPHY, A.M., M.D., LL.D., F.R.C.S., F.A C.S. Price, $2.00 Volume III, The Eye, Ear, Nose and Throat, edited by CASEY A. WOOD, C.M., M.D., D.C.L, ALBERT H. ANDREWS, M.D., and WILLIAM L. BALLINGER, M.D. Price, $1 50. Chicago: The Year Book Publishers, 1914. Price of series of ten volumes, $10.00.

This series is based on a sound principle. It is carried out with good sense. The various books which compose it are handy and cheap. The information which they contain is fresh and well arranged, and there is judicious comment where comment is needed. Each volume is complete on the subject with which it deals. A physician who wishes to know what is being done in medicine could not do better than to spend ten dollars on this series.

DISEASES OF INFANCY AND CHILDHOOD. THEIR DIETETIC, HYGIENIC, AND MEDICAL TREATMENT. By LOUIS FISCHER, M D. Fifth edition. Philadelphia, F. A. Davis Company, 1914.

There seems to be no finality in the dietetic management of children. At one moment the protein element was avoided and fat was the thing. Sugar at least was considered neutral. Now it is the fashion to give protein in liberal amounts, to give fat with

a sparing hand, and avoid sugar as a disturbing element. The method now in vogue for the feeding of infants is fully described in this edition of Dr. Fischer's book, and it may instructively be compared with the methods as described in previous issues. The present edition is the fifth. In contents, bibliography, and arrangement it deserves increasing praise.

A Treatise on Clinical Medicine. By William Hanna Thomson, M.D., LL.D., formerly professor of practice of medicine and of diseases of the nervous system in the New York University Medical College; Octavo volume of 667 pages. Philadelphia and London: W. B. Saunders Company 1914. Cloth $5.00; half morocco $6.50.

It is not often that we have the privilege of reading a book which emanates from the staff of the Roosevelt Hospital; this one is written from the standpoint of the hospital physician to serve other physicians who are engaged in the performance of their professional duties. Dr. Thomson ever keeps the living patient in view, admitting at the same time that a large preliminary preparation is necessary before the patient can be viewed in the true light. The book begins with a discussion of the meaning of certain common but important symptoms. Remedies are considered with a classification according to the indications for their use. Then follows the portion which deals with infection by micro-organisms. The book closes with a consideration of diseases which are peculiar to the different organs and tissues. It is an ambitious work, and demands for its presentation a volume of nearly seven pages, beautifully printed, and well bound, as all Messrs. Saunders books are. Such symptoms as pain, emaciation, cough, dyspnœa, œdema, and vomiting are treated with a fullness which their importance deserves; and remedial measures are described under the headings of electricity, the action of cold, and of heat. The effect of change has a suggestive paragraph to itself. To give a catalogue of the various headings in the book would not serve in the slightest to indicate its value. It makes pleasant reading and the theme is relieved by much wise comment and many interesting observations. We would call especial attention to the section on drug habits and on epilepsy. The book is a credit to the hospital from which it comes, and will be of interest and value to the reader.

Books Received

The following books have been received and the courtesy of the publishers in sending them is duly acknowledged. Reviews will be made from time to time of books selected from those which have been received.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE. Volume VII., No. 7, May, 1914. Price 7s 6d net. London, Calcutta, Bombay and New York: Longmans, Green and Co npany.

THE MYTH OF THE BIRTH OF THE HERO (A PSYCHOLOGICAL INTERPRETATION OF MYTHOLOGY). By OTTO RANK, of Vienna. Monograph Series No. 18 of the Journal of Nervous and Mental Diseases. New York: Journal of Nervous and Mental Diseases Publishing Company, 1914.

MODERN MEDICINE ITS THEORY AND PRACTICE. IN ORIGINAL CONTRIBUTIONS BY AMERICAN AND FOREIGN AUTHORS. Edited by SIR WILLIAM OSLER, Bart., M.D., F.R.S., and THOMAS MCCRAE, M.D. In five octavo volumes, illustrated. Volume III, Diseases of the Digestive System—Diseases of the Urinary System. Price per volume, cloth, $5.00 net; half morocco, $7.00 net. Philadelphia and New York: Lea and Febiger, 1914.

DISEASES OF THE RECTUM AND COLON AND THEIR SURGICAL TREATMENT. By JEROME M. LYNCH, M.D. Octavo, illustrated. Price, cloth, $5.00 net. Philadelphia and New York: Lea and Febiger, 1914.

DISEASES OF INFANCY AND CHILDHOOD. THEIR DIETETIC, HYGIENIC, AND MEDICAL TREATMENT. By LOUIS FISCHER, M.D. Fifth edition. Philadelphia, F. A. Davis Company, 1914.

A HANDBOOK OF FEVERS. By J. CAMPBELL MCCLURE, M.D. London: Shaw and Sons, 1914.

A Clinical Study of the Serous and Purulent Diseases of the Labyrinth. By Dr. Erich Ruttin. Authorized translation by Horace Newhart, M.D. Illustrated. Price, $2.00 net. New York: Rebman Company, 1914.

Examination of the Urine and other Clinical Side-Room Methods. By Andrew Fergus Hewat, M.B., Ch.B., M.R.C.P. Fifth edition. Price, 1s. 6d. net. Edinburgh: E. and S. Livingstone, 1914.

The Practical Medicine Series Comprising Ten Volumes on the Year's Progress in Medicine and Surgery. Under the general editorial charge of Charles L. Mix, A.M., M.D., and Robert T. Vaughan, Ph.B., M.D. Volume I, General Medicine, edited by Frank Billings, M.S., M.D., and J. H. Salisbury, A.M., M.D. Price, $1.50. Volume II, General Surgery, edited by John B. Murphy, A.M., M.D., LL.D., F.R.C.S., F.A.C.S. Price, $2.00. Volume III, The Eye, Ear, Nose and Throat, edited by Casey A. Wood, C.M., M.D., D.C.L., Albert H. Andrews, M.D., and William L. Ballinger, M.D. Price, $1.50. Chicago: The Year Book Publishers, 1914. Price of series of ten volumes, $10.00.

Proceedings of the Royal Society of Medicine, June, 1914. Volume 7, No. 8. Price, 7s. 6d. net. London, New York, Calcutta, Bombay: Longmans, Green & Company.

Local Anæsthesia. By Arthur Schlesinger, Berlin. Translated by F. S. Arnold, B.A., M.B., B.Ch. Illustrated, price, 5s. net. London: William Heinemann. New York: Rebman Company, Limited. Toronto: McAinsh & Company, Limited, 1914.

A Text-Book of General Bacteriology. By Edwin O. Jordan, Ph.D. Illustrated, fourth edition, price, $3.00 net. Philadelphia and London: W. B. Saunders Company. Canadian Agents: The J. F. Hartz Company, Limited, Toronto.

Public Health Laboratory Work. By Henry R. Kenwood, M.B., F.R.S., D.P.H., F.C.S. Sixth edition, with illustrations. Price, 10s. net. London: H. K. Lewis, 1914.

ON DREAMS. By PROFESSOR DR. SIGM. FREUD. Translated by M. D. EDER with introduction by W. LESLIE MACKENZIE, M.A., M.D., LL.D. Price, $1.00. London: William Heinemann. New York: Rebman Company, Limited. Toronto: McAinsh & Company, Limited, 1914.

A TEXT-BOOK OF MEDICAL DIAGNOSIS. By JAMES M. ANDERS, M.D. and L. NAPOLEON BOSTON, M.D. Second edition thoroughly revised. Illustrated. Price, $6.00 net; half morocco, $7.50 net. Philadelphia and London: W. B. Saunders Company, 1914. Canadian Agents: The J. F. Hartz Company, Limited, Toronto.

A TEXT-BOOK OF MILITARY HYGIENE AND SANITATION. By FRANK R. KEEFER. Illustrated. Price, $1.50 net. Philadelphia and London: W. B. Saunders Company, 1914. Canadian Agents: The J. F. Hartz Company, Limited, Toronto.

COLLECTED PAPERS FROM THE RESEARCH LABORATORY PARKE, DAVIS & COMPANY, Detroit, Michigan. Reprints, Volume II, 1914.

THE SENSORY AND MOTOR DISORDERS OF THE HEART: THEIR NATURE AND TREATMENT. By ALEXANDER MORISON, M.D., F.R.C.P. Price, $2.50. Toronto: McAinsh & Company, Limited, 1914.

THE POCKET FORMULARY FOR THE TREATMENT OF DISEASE IN CHILDREN. By LUDWIG FREYBERGER, J.P., M.D., M.R.C.S. Fourth revised and enlarged edition, adapted to the British Pharmacopœia with an appendix on poisons, their symptoms and treatment. Price, $2.25. London: Wm. Heinemann. New York: Rebman Company, Limited. Toronto: McAinsh & Company, Limited, 1914.

ANOCI-ASSOCIATION. By GEORGE W. CRILE, M.D., and WILLIAM E. LOWER, M.D. Illustrated. Price, $3.00 net. Philadelphia and London: W. B. Saunders Company, 1914. Canadian Agents: The J. F. Hartz Company, Limited, Toronto.

Res Judicatæ

PUBLIC HEALTH IN ONTARIO

THE Provincial Board of Health was established in the year 1882, when the first Public Health Act of the province was enacted. The Board with its secretary were for many years the sole public health workers in the province. Epidemics of smallpox and of various communicable diseases, the sanitary conditions of the province, the water supplies, sewage works and the care of lumber camp employees were controlled and supervised with the aid of occasionally employed medical students and young medical practitioners, through the indefatigable energies of Dr. Peter H. Bryce. In the year 1899, Dr. Charles A. Hodgetts, who since 1896 had been in the service of the Board, was appointed provincial medical inspector, and when Dr. Bryce resigned in 1904, to enter the immigration service at Ottawa, he was succeeded by Dr. Hodgetts, and Dr. R. W. Bell was appointed provincial inspector. During these later years several extensive outbreaks of smallpox in the newer portions of the province, typhoid fever in Fort William, Cobalt, and other places, left these officers with but little leisure. In 1906, Mr. George E. Young was appointed sanitary inspector for the province and upon him devolved much of the duty of looking after the hundreds of lumber, mining and railway construction camps in North-Western Ontario. These officers performed their duties in a fearless and most zealous manner and a great deal of credit is due them and to the members of the various provincial boards of health with whom they worked.

Since the laboratory of the Provincial Board was first established, under Professor J. J. Mackenzie, valuable services have been provided the medical practitioners of the province and the public generally, in relation to the diagnosis of typhoid fever, diphtheria, tuberculosis, and in the examination of water supplies. Professor Mackenzie was succeeded in 1900 by Dr. John A. Amyot, under whose direction the laboratory has grown from small beginnings to large dimensions. An experimental station was established for practical demonstration of water purification and sewage treatment.

The station and the laboratory continue to employ a considerable number of active scientific workers. In 1910, Dr. Hodgetts became medical adviser to the Conservation Commission of the Dominion of Canada and was succeeded by the writer, under whose régime the Public Health Act was revised and consolidated, a system of district officers established, and a provincial sanitary engineer, Mr. F. A. Dallyn, C.E., appointed.

The district officers were appointed under the Public Health Act of 1912, which provides that the province may be divided into ten districts to each of which a legally qualified medical practitioner may be appointed. These officials are full-time men and their salaries and expenses are paid primarily by the government, which is in turn recouped by the groups of counties embraced in the various districts. In the unorganized portions of the province the government pays its proportionate share of the expenses. At the outset the province was divided into seven districts.

All of these officers had been medical practitioners of first-class standing in the province, and before entering upon their duties had a course of training in sanitary work provided by the Provincial Board and the University of Toronto. Their duties are briefly set out in Section 13 of the Act as follows: "Every District Officer of Health shall within his district enforce this Act and the Regulations, and any other Act or Regulations respecting the health of the inhabitants of the district or their protection from communicable disease, and generally do within the district anything which a member of the Provincial Board, medical officer of health or sanitary inspector is authorized or required to do under this Act." While their special duties are confined to their respective districts, these officers are liable for duty in any portion of the province. They are under the control and supervision of the Board and report monthly or oftener as required. The jurisdiction of each of these officers being over such a large area, it seemed desirable that the earliest of their duties should be to gain an acquaintance with their respective territories as soon as possible. With this object in view information relative to the sanitary conditions of the various municipalities under their care was sought and classified as far as possible under the headings of a schedule. In this manner the acquaintance of the local officers, boards of health, municipal and county councillors was readily attained, and the coöperation of the various bodies secured. In all cases the officers report that there is a very marked demand for, and apparent appreciation of, their services, and in the short time during which they have been

in office the Board has received from numerous quarters expressions of appreciation of their work and approval of the legislation which has established this system.

In the short time during which these officers have been on duty they have performed valuable services in the province by their efforts in improving the sanitary conditions in numerous places; in assisting municipalities having outbreaks of communicable diseases; in advising local boards of health and local medical officers of health in difficult problems; in developing a demand for medical and sanitary inspection of schools; in spreading general sanitary knowledge in connection with the health exhibit lectures among the public and relieving in no small manner the executive of the Board of serious and difficult questions.

Were the territories of the district officers less extensive they could do better work, or at all events work which would at an earlier date show more fruit. The Board is satisfied, however, that a good beginning has been made, and that the intelligence of the great mass of our people needs only to be aroused, and supplied with knowledge of sanitary questions to make them alive to the value of a sound, sane, public health.

The good work which our men are doing will no doubt, before long, be the best reason for increasing their number.

The work done by the district officers has been ably supplemented by the various medical officers of health, who to the number of some seven hundred and fifty or more, serve usually for small remuneration the townships, villages, towns and cities of the province. It is regrettable that the good work done by the medical officers of health in smaller communities is so little appreciated and poorly paid. Some improvement, however, has been made by their permanency under the Act of 1912, and it is encouraging to see that a number of the municipalities have increased the remuneration during the past year.

During the past year a notable service was performed by the Provincial Board of Health in the investigation of the pollution of the waters of the Great Lakes. The International Joint Commission, comprising three representatives each from the United States and Canada had conceived the idea of making an investigation into the extent and degree of the pollution of the waters lying between the two countries, with the object of discovering if the sewage entering these waters travelled across the international boundary and was a source of injury to the citizens of one or other country. As the Province of Ontario from its geographical position,

lying as it does for some fifteen hundred miles along the United States frontier on these waters, was the most vitally concerned of any part of Canada, the Provincial Board was invited to offer suggestions as to the best method of procedure. Following this our Board offered to supply a sufficient number of qualified men for this work, providing the Commission paid the expense other than the salaries of these men. This offer was accepted and in April of last year eight men were detailed for this work. On the United States side a similar service was detailed by the United States Public Health Service and by the States of Michigan and New York. Some work was done by the Provincial Board of Health of Quebec. The work was continued from April till November of last year when it was completed. On our side the waters were examined all the way from the Rainy river to the St. Lawrence. The report of this, the most extensive series of water examinations heretofore made by any country, has just been published and will be a future mine of information upon this important subject.

The Board has now in operation three laboratories where free service is given to medical practitioners and the public in the diagnosis of typhoid fever, diphtheria, tuberculosis, rabies and in the examination of water supplies. These laboratories are located at Toronto, Kingston and London and will probably be supplemented by additional ones at an early date. A supply of outfits for this work is provided the various local medical officers of health for distribution among the medical men of each municipality. The laboratory also provides treatment of suspected rabies cases at cost and typhoid vaccine free of charge to all medical practitioners of the province who desire it for their practice.

Just lately the Board has been able to make arrangements for the supply of diphtheria antitoxin at greatly reduced prices. The people of the Province of Ontario have been paying outrageous prices for this product in the past, the cost being anywhere from 50 cents to $2.00 per 1,000 units. In cities this valuable preventive and curative serum has been as a rule supplied free of charge to those unable to pay for it. These and the well-to-do have consequently not suffered inconvenience, but the middle class portion of our people, desirous of paying their way, have been seriously handicapped by the excessive price. The result of this is well illustrated by the death rate from diphtheria in Toronto. In the Isolation Hospital, where the cases are admittedly not of the mildest type, the death rate of last year was 6·5 per cent. In the city at large it was 16 per cent. By the plan adopted by our Board the

price has been reduced to 22 cents* in large quantities and 25 cents as a general rate. In syringe package the price is 10 cents additional. A great deal of credit is due the enterprise of the University of Toronto in establishing a laboratory for the manufacture of this and other bacteriological products. Already the provinces of Saskatchewan and Nova Scotia have followed the lead of Ontario in supplying antitoxin at these reduced prices.

Within the limits of a short paper it is impossible to do more than mention many of the evidences of the advance of public health in Ontario. Some of these are the public health and moving picture exhibit, for which there is an annual appropriation of $7,000, the reduction of our tuberculosis rate from 148 to 90 per 100,000 in ten years, the greatly increased interest in public health matters, illustrated by a declaration of a public man in one of our largest cities, "Public health is my best campaign stuff, more valuable in an election contest than any other topic of discussion," and the fact that within the last two years five candidates have taken the Diploma of Public Health.

During the present year the legislature has confirmed the powers of the Board in reference especially to its control of water supplies. This is shown in its unanimous passage of a Bill in reference to the proposed water supply of the city of Ottawa; the Bill covering this declaring that the supply must be approved by the Board, and in the event of the Council of the Corporation of that city refusing to carry out the decision of the Board the latter is empowered to take over the whole matter, levy for the cost, and establish the works.

JOHN W. S. MCCULLOUGH, M.D., D.P.H.
Toronto Chief Officer of Health.

*Lately reduced to 20 cents.

IT has been decided that the next meeting of the Ontario Medical Association will be held in Peterboro in May, 1915, probably in conjunction with the Medical Health Officers' Association. The names of the officers and of the committees, which have already been organized, will be found on another page.

Retrospect

ABSTRACTS OF GERMAN LITERATURE

IN the August number of this JOURNAL there appeared an article referring to Dr. Mark Jansen's work "Das Wesen und das Werden der Achondroplasie" (Achondroplasia, its cause and nature). The latter is briefly reviewed in the *Muenchener Medizinische Wochenschrift* as follows: "Achondroplasia results from a tight-fitting amnion. The pressure of the amnion is capable of causing mechanical changes in the embryo. In the first embryonal stage (first and second week) it causes a crumpling of the embryo in its long axis and injury to the soft tissues. In the second stage (third to sixth week) it causes a rolling up of the embryo by pressure on the neck and buttocks, and inhibition to growth of the base of the skull, sacrum, and extremities. In the third stage the bones are already formed and the amniotic pressure hinders the growth of the concave side of the curved embryo. In the first stage occur deformities such as anencephalus; in the second stage achondroplasia; in the third stage deformities such as club foot. In fact the cause of many congenital deformities is thus suggested. Narrow amnion is a condition from which many families suffer in their pre-natal existence. The address is original and worth reading"

In an article dealing with salvarsan-serum in No. 14 of the *Muenchener Medizinische Wochenschrift* by an assistant in Neisser's clinic at Breslau these two questions are asked. (1) How long after an intravenous injection of salvarsan can one demonstrate substances in the blood that are therapeutically active? (2) Are these substances the remains of the injected medicament or do they play a somewhat specific role as antibodies? The author describes his experiments and answers the questions as follows. (1) After the injection of a relatively high dose of salvarsan there are chemical as well as biological substances still demonstrable in the blood stream for as long as seven days. (2) It is impossible that these substances are intact residual salvarsan, but would seem to be rather in the nature of oxidation products. Whether biological

antibodies come into play cannot be determined by animal experimentation.

In the *Muenchener Medizinische Wochenschrift*, No. 14, Mendl, of Brünn, describes an early sign of cerebral hæmorrhage. "In the early stage there is frequently a hyperæmia of one side of the face and head, accompanied by a congestive seborrhœa. The affected side of the face is then covered with a thin, fluid film of fat. The unilateral hyperæmia corresponds to the side of the brain where the hæmorrhage is occurring. In addition the hairs on the affected side of the head become erect, remain so for hours, and cannot be brushed flat. Finally the face becomes pale and sunken and the expression anxious; then the signs of hæmorrhage set in." The author lays great stress on the contraction of the musculi arrectores pilorum and states that he bases the prognosis on this phenomenon.

TREATMENT OF FURUNCULOSIS IN CHILDREN BY THE THERMO CAUTERY. From Dr. Neisser's Clinic in Heidelberg. *Muenchener Medizinische Wochenschrift*, No. 14.

In November, 1911, was first published an article recommending the treatment of furuncles by the actual cautery. The author has had great success with this procedure, provided the condition was treated sufficiently early. The cautery destroys the nest of bacteria without opening the blood and lymph channels. "In children one does not see such definite, indurated boils as in adults, but rather several soft skin-abscesses which readily break down and quickly yield to the cautery treatment. A small crucial opening is made, and by reason of its being burned, not incised, the skin has not the same tendency to heal over too rapidly, and thus drainage is more easily established. Furuncles treated in this way show no infiltration by the third day and soon disappear, leaving only a small scar. After the surgical treatment we give the child a good washing with soft soap. Whether one should surround the abscesses with a ring of salve before opening is questionable, especially in practice, for, although it prevents the liberated pus from flowing over healthy skin, there is the danger of a mixture of pus and salve remaining which will get rubbed into the skin and result in the formation of fresh abscesses. In our clinic we merely dry off the pus, wash with soft soap, and lay some guaze over the opening, avoiding a bandage where possible so as not to irritate

the skin. In order to compare our method with the treatment by incision we made a point of incising some abscesses and cauterizing others in the same patient. In every case the cauterized lesions drained more readily and healed more rapidly than those incised. Moreover the pain is not severe and of but short duration."

In the *Monatschrift für Geburtshilfe und Gynaekologie*, Kreiss, of Dresden, reports the case of an infant with imperforate anus who passed meconium through the urethra. A laparotomy showed that there was not, as expected, a communication between bladder and bowel, but that the rectum emptied into the urethra. The rectum was separated and a plastic operation performed but the child died.

G. C. Hale.

London, Ont.

Obituary

Dr. G. H. Groves, of Carp, Ontario, died August 18th. Dr. Groves was born at Fitzroy in 1850, and graduated from McGill University in 1879. He at once went into practice at Carp and there continued his professional duties until last April. Dr. Groves was president of the Carleton County Conservative Associations for several years

Dr. T. Herbert Jackson, of Montreal, died at the Western Hospital on Sunday, August 23rd. Dr. Jackson had been in charge of hospital and medical work on the eastern division of the Transcontinental Railway.

Dr. Bruce Livingstone Riordan, of Toronto, died on Saturday, August 29th. Dr. Riordan was of Irish descent, and was born at Port Hope on March 17th, 1859. Before he was twenty-one, Dr. Riordan graduated from McGill University and, after spending nearly two years as ship's surgeon on the Allan boats, he took the necessary examinations at the University of Toronto, and, in 1881, went into practice at Toronto. He was appointed one of the twelve surgeons of the Grand Trunk Railway and soon built up an excellent practice. Dr. Riordan was a specialist in

traumatic surgery and was the recipient of many honours. He became chief surgeon of the York Radial Railway, divisional surgeon for Ontario of the Grand Trunk Railway, dean of the staff of Grace Hospital, consulting surgeon to the Toronto General Hospital, president of the Æsculapian Club, vice-president of the Ontario Medical Association, and president of the section of surgery of the Toronto Academy of Medicine. He leaves a widow and one son.

Dr. Frederick E. Thorold died at Kamloops, British Columbia, on Wednesday, September 1st, in the eighty-fourth year of his age. Dr. Thorold was born in England in 1830, and was a graduate of Kingston College, Hull. He came to Canada in 1851, and entered the Toronto School of Medicine. He continued to practise until 1880.

Dr. Fred Parker, of Stratford, Ontario, died July 11th, in the forty-ninth year of his age. Dr. Parker entered Trinity Medical College in 1891, and while there won the first scholarship in each year, the special prize in physiology in his first year, and the gold medal in his final year. He first went into practice at Bruce Mines, then at Milverton, and afterwards removed to Stratford. He had a large country practice and was an indefatigable worker.

News

ONTARIO

The Hamilton Hospital by-law for $125,000 was submitted to the ratepayers on August 17th last, and was defeated. It was the intention that the money, if voted, should be expended upon improvements to the city hospital. The plans for the new hospital are in progress. The cost will be about $200,000. The building will be three storeys high and will contain accommodation for five hundred patients.

One thousand dollars has been contributed to the Patriotic Fund by the Toronto Academy of Medicine.

DURING the month of August, 715 cases of communicable disease were reported in the province; they were, smallpox, 6 cases; scarlet fever, 71 cases, 2 deaths; diphtheria, 172 cases, 10 deaths; measles, 148 cases, 2 deaths; whooping cough, 52 cases, 5 deaths; typhoid fever, 126 cases, 10 deaths; tuberculosis, 124 cases, 72 deaths; infantile paralysis, 11 cases; cerebrospinal meningitis, 5 cases, 5 deaths.

MEASLES has been very prevalent in Hamilton during the summer. The measures taken by the health authorities, however, have been successful in preventing further cases of the disease.

THE Essex County tuberculosis hospital at Union has been enlarged by the addition of a ward seventy-five feet long with accommodation for ten patients.

AT the recent meeting of the Clinical Congress of Surgeons, which took place in London, England, Dr. Herbert A. Bruce was elected first vice-president. Dr. Charles H. Mayo, of Rochester, Minnesota, is the president.

QUEBEC

THE *Congres des médecins de langue francaise de l'Amérique du Nord*, which was to have taken place at Quebec in September, has been postponed indefinitely on account of the war.

DR. E. S. AUBREY, of Hull, has been elected a governor of the College of Physicians and Surgeons of Quebec, to represent the counties of Ottawa, Labelle, Wright, and Pontiac.

DR. E. R. BROWN, of Montreal, has volunteered for active service with his regiment, the Fifth Royal Highlanders of Canada.

ALBERTA

AN outbreak of scarlet fever occurred in Calgary in July in which the cause of infection was rather unusual. The cases—twenty in number—were all infected through milk received from one dairy, where a young man was employed who was suffering from a slight attack of the fever. When the source of infection was discovered and the dairy premises closed and disinfected, no further cases were reported.

A HOSPITAL was opened at Grassy Lake on July 18th. It has been founded to provide accommodation for homesteaders in the district in cases of accident or illness. Contributions amounting to $1,000 were made towards the hospital. The medical superintendent is Dr. L. K. Poyntz.

SASKATCHEWAN

SEVERAL of those who had promised to read papers at the recent meeting of the Saskatchewan Medical Association were unable to attend on account of having volunteered for active service. Surgeon Major H. E. Munro and Surgeon Lieutenant R. H. MacDonald, both of Saskatoon, are with the troops at Valcartier Camp.

SINCE there are only twenty-six hospitals in the province, with a total bed capacity of from eleven to twelve hundred, it is suggested that rural municipalities should join together in establishing hospitals and should each contribute towards them. A grant of fifty cents a day is made by the government for each patient and one dollar and fifty cents is allowed for patients who are unable to pay anything. The need is felt particularly in country districts and public meetings have been held recently by Dr. Seymour in order to encourage the building of such hospitals.

A CIRCULAR has been sent out by the provincial bureau of health to teachers in the province, requesting that occasionally they give lessons in matters of hygiene. Bulletins containing information on scarlet fever, typhoid fever, diphtheria, and smallpox accompanied the circular. It was requested also that teachers impress upon the pupils the necessity of conforming with the regulations recently made concerning drinking cups and towels.

THE plans have been prepared by the Department of Public Works for an addition to the Battleford Insane Asylum. The women's portion is large enough for requirements at present, but more accommodation is required for the male patients on account of the rapid increase in their number. The plans have been prepared for three additional units, but at present only one will be built. A warehouse, with refrigerating plant is to be built also; it will serve as a storage for provisions and a portion of it will be used as a tailor's shop for the making and repairing of patients' clothes.

IT has been found necessary to suspend work on the sanatorium which is being built by the Saskatchewan Anti-tuberculosis League at Fort Qu'Appelle. The reasons for this action are found in the present financial stringency. Already $150,000 has been spent on the buildings, which were to cost about $225,000.

BRITISH COLUMBIA

A HEALTH by-law was recently passed by the Point Grey city council, Vancouver, which gives authority to the medical officer of health to isolate any person who, in his opinion, is suffering from tuberculosis.

THE Chilliwack Hospital is to be enlarged.

ON Wednesday, August 19th, a new surgical ward containing twenty-five beds was opened in the Vancouver General Hospital.

Canadian Literature

ORIGINAL CONTRIBUTIONS

The Canadian Practitioner and Review, September, 1914:

Health problems in Canada	C. J. Hodgetts.
Personal experiences with radium	W. H. B. Aikins.
Artificial pneumothorax in the treatment of tuberculosis	W. B. Kendall.
Public health in Ontario	J. W. S. McCullough.

Dominion Medical Monthly, September, 1914:

The histological and clinical changes induced by radium in carcinoma and sarcoma	W. H. B. Aikins and K. M. B. Simon.

The Public Health Journal, August, 1914:

Public abattoirs	J. T. J. Vallance.
Conditions affecting the efficiency of sewage disposal works in Canada	R. H. Murray.

Economics of sewage disposal . . .	R. Potter.
Results of mechanical gravity filtration of Saskatoon	G. B. Clark.
The non-identity of modern leprosy and biblical leprosy	H. W. Hill.
President's address to the Canadian Association for the Prevention of Tuberculosis	Sir Adam Beck.
The legal aspect of sanitary inspectors' work	T. Watson.
The engineer and social service . . .	S. Parry.
How may the medical health officer help the social worker	H. T. Falk.
The training of our orderlies	M. MacDonald.

L'Union Médicale du Canada, August, 1914:

Methodes modernes de combattre la tuberculose, maladie des masses . . .	M. S. Knopf.

Medical Societies

MONTREAL MEDICO-CHIRURGICAL SOCIETY

THE fourteenth regular meeting of the society was held Friday evening, April 17th, 1914, Dr. D. F. Gurd, president, in the chair.

Dr. W. P. Northrup, of New York, professor of diseases of children at the New York and Bellevue School of Medicine, and visiting physician to the Presbyterian Hospital, addressed the meeting on the subject of "Fresh air treatment: the when, the how, and the wherefor." The following is a report of the address: "In speaking of good and bad air in sickness and in health I wish first to put myself right with you and to say that I do not want to appear loaded with coals for Newcastle; I have not come thinking to give you any points on the science of medicine here in this great centre of knowledge and teaching, but only a few words on a subject which is of vital interest to me. The old theory of bad air was of some chemical change; D'Arsonval and Brown Sequard contended that there was a breath poison, an anthropotoxin. Hermans maintained that the injurious effect was not from chemical changes, but

from an accumulation of body heat, warmth, and increased moisture about the body, hindering its cooling. Experiments were performed by Paul by putting different persons in glass cases under different conditions: he himself went into such a cabinet thirteen times. With the temperature kept low, say about 60°, and with absolutely no air admitted, he stayed in four and a half hours and suffered no inconvenience of any kind. He proved that it was not the air that they breathed. Raising the temperature of the air in the cabinet to 72° there were at once felt symptoms of acute suffocation, a band-like feeling around the head, oppression of the chest, dizziness, nausea and faintness, and a sense of falling—acute symptoms of poisoning. He could stay only ten minutes in this high temperature when he began to feel these striking symptoms. He now established that it was the *Warmestauung* or accumulation of heat around the body which gave the acute poisonous effect, and this was due to three elements, *heat*, *moisture*, and *stagnation:* the same conditions you have noticed on a sultry day in summer before a thunder storm.

"In order to find out whether there was such a thing as breath poisoning, in one experiment, where the degree of temperature was high and the person in it suffering from the symptoms mentioned, he was allowed to breathe the outside air for some time, but it had no effect upon his symptoms. As an illustration of stagnation forming one of the causes of the bad effects, while a labourer was in the cabinet suffering from this 'poisoning' a revolving fan was started inside the cabinet and the man said he felt much better and thought they had opened the door. In other words the air was stirred up around the body and the difference was such that evaporation would go on and he was cooled down. These classical experiments were most elaborately carried out. All grades of heat, moisture, and stagnation were tested on the person in the cabinet. For instance he wanted to determine whether there was not some exact method of testing the heat storing or heat accumulation of the body. By a very delicate electrical thermometer placed on the brow and under the man's clothing, he could test and by actual measurement found that the man's temperature went up two or three degrees before there were distinct symptoms. If a lady faints in the theatre, for instance, it is not in the first or last act, but somewhere about the middle she experiences these sensations of acute poisoning—suffocation, etc. When she enters she is more or less cool, the room has not yet the accumulation of moisture from the bodies of those present and the temperature is fairly low. About the last half of the second act that lady will faint. We take

her to a window and let the cool air blow on her and the result is that she revives; the steam jacket that has been around her is displaced by the cool moving air; the same thing would be accomplished by the vigorous use of a large fan.

"Another illustration is that of a professor, a mountain climber, who with his guides and helpers arrived one night at a half-way cabin where they all turned in, shut everything up tight and slept well. Very early the professor woke up and went outside. Returning he was struck with the extreme stuffiness of the cabin and hurried to waken the sleepers, who did not like being disturbed. Here no ill effects were experienced because the temperature was low; had it been high through the night, however, considerable discomfort and headache would have resulted if nothing more serious. Lower sleeping berths in over-crowded cars are another example of 'stuffiness' with consequent headache in the morning. An example of living conditions with cool air indoors is that of a neighbour of mine whose house was exposed in the cellar on account of excavations in the lot adjoining, and who could not use the furnace on account of holes in the wall where 'needles' penetrated in order to support the wall. All their friends expected that those in the house would be ill with sore throats, colds, and even pneumonia, but the result was that they never passed a more healthful winter, in spite of the fact that the air in the house was not what would be called fresh air, but it was of a uniformly low temperature.

An interesting fact in connexion with the taking of cold through changes of temperature is that those with dry skins are not susceptible. For instance, in climbing the Himalayas, guides and tourists wear a combination garment of blanket and overcoat which is belted at the waist. In climbing the mountain, on its sunny side, the upper part of this garment is let down over the rope or belt at the hips and many indeed even strip everything to the waist in order to arrive at the top dry skinned. When this is accomplished they draw on their garments, which are dry, and no chill is experienced. The top atmosphere of these lofty mountains is cold and clear and rapid unwarming of the body produces a chill and frequently pneumonia.

"A very interesting human experiment in bad air was that of the tragedy of the Black Hole of Calcutta in 1756. A report of this appeared in the *Annual Register* for 1758, the seventh edition was printed in London in 1783, copies of which I saw in Andrew D. White's library in Syracuse, N.Y., and in the Lenox Library. The story must be familiar to you all. The place was Calcutta,

Bengal, in mid-summer, where the heat is difficult for Europeans to endure under most favourable circumstances—the constant waving of fans night and day, etc. The ruler was incensed because a wealthy merchant had been unjustly imprisoned by one Drake who had large factories in the town in which were employed Englishmen. The Viceroy or Suba was a degenerate drunken young man and was possessed of the idea that much treasure was to be found in these works. He therefore laid seige to the place. Drake disappeared, and one Holwell took charge of the defence. They were obliged to surrender and were given assurance that no harm would come to them and the men were turned over to the sergeants for guards. The prisoners were gathered on the piazza and at night were driven into a room about eighteen feet square and twelve feet high, one hundred and forty-five men and one woman, the soldiers could barely pack the last man in. There were two iron-barred windows and they were on the side away from the prevailing wind. Inside the room was a platform about six feet wide and four feet high. The men were placed in this room at eight o'clock in the evening on a close sultry night, even for Bengal, and when released at six o'clock next morning only twenty-three had survived. Holwell, who wrote an account of his experience in this room, was the first to enter and went straight to one of the windows. Before nine o'clock (one hour) the occupants were in a desperate state—profuse perspiration and raging thirst. They removed their clothes, this gave them relief for a moment, they waved their hats thinking to produce a current of air, they tried squatting down so that they would have more air above and possibly more breathing space. During this experiment many were so weak that they were unable to rise again and were trampled to death or suffocated. During the second hour the thirst became intense, respiration was difficult and some became delirious. Holwell standing by the window now began to feel the same symptoms of thirst and difficult breathing and the atmosphere in the room became charged with 'a strong urinous volatile effluvia' and there was a constant cry for water. Water was conveyed into the room in hats forced through the bars of the windows, but most of it was spilled owing to the crazed state of the men, but even those who got a little found that it did not help much. By eleven o'clock one-third of the occupants of the room were dead. Holwell worked his way from the window where he had been jammed by those behind trying to get at the window for the water, and crossing over the dead to the other side of the room lay down on the platform to die.

"All this time the guards dared not waken the drunken ruler and it was not until six o'clock the next morning that they reported to him the desperate condition of affairs. He then sent word to open the doors and search for Holwell. After some difficulty (so great was the pressure of bodies against the door) this was done and, after considerable search, Holwell was found on the platform under several bodies in an unconscious condition. When brought before the ruler he could not speak so great was his exhaustion, though he tried to explain that they had no treasure. Holwell mentions that the steam and stench from both the dead and the living bodies was insufferable and that about two a.m. he was sensible of no pain and only a little uneasiness and fell into a stupor.

"This constitutes a rare experiment on bad air as well as a wonderful lay record. Paul's experiments go to show that these people did not die of poisoning by the breath, but from the conditions of heat, moisture, and stagnation—body-heat accumulating.

"What is good air? A good air is a cool air. All human beings in health are continuously making and radiating heat, they must be able to part with it largely by evaporation of the moisture, the heat radiating into a medium which is ready to receive it. There must not be a steam jacket immediately about the body; it must be dispersed by motion. Health requires cool, fresh, flowing air.

"I contend that cold is an important part in the fresh air treatment of various diseases. Cold, fresh, flowing air furnishes the main stimulating element in winter that is lacking in the summer. In the Children's Service at the Bellevue Hospital the cold fresh air treatment for pneumonia was carried out extensively with excellent results. To quote from Howland and Hoobler: 'The effect of cold fresh air on patients with pneumonia was always to produce a rise in blood pressure and on removal to a warm but well ventilated ward, a fall in blood pressure. The rise is not apparent until half an hour or more, sometimes an hour, after being put out of doors and it does not reach the maximum for about two hours. Thereafter the effect, as far as we have observed, is continuous for even as long as thirty hours and we have not observed any tendency for the pressure to fall as if from exhaustion of the effect. On the other hand, after removal from cold, fresh air, the blood pressure falls rapidly; the fall is apparent in fifteen or twenty minutes and usually reaches its lowest point in an hour, to remain at this minimum unless influenced by the course of the disease, by stimulation, or by the child being again placed out of doors, when it rises again. . . . We have been unable to produce results

by putting children out of doors in warm weather, therefore the all-important factor is the cold—a reflex stimulation of the vasomotor centre by the action of cold air on the skin of the face and on the nasal mucous membrane, a constant and continuous effect, the pressure remaining at a higher level for hours, showing no tendency to fall, and even after a return to the ward it does not fall to a point below that previously obtaining at the ward temperature. There can be no doubt that when the pressure is abnormally low an increase in this, which is accomplished without disturbance or irritation, which is constant and continuous, and which causes no exhaustion or bad effects, is of the greatest value. We have observed no bad effects on the circulation nor have any been reported, notwithstanding the prevalence of the cold air treatment of pneumonia and the lack of selection of patients to be treated by this method.'

"I have been asked over and over again what percentage of pneumonias get well on this treatment, but I have refused to give figures, the number of cases being insufficient. All I ask of anybody is to try it and they will not go back to the other treatment. Put the child out and if it becomes rosy and calm and goes to sleep, takes its food, has a better tongue and recovers, you do not need to explain this. The air, moreover, should be cold, fresh, flowing air. A baby with a dry skin never catches cold. In connexion with the subject of dry skin we are all now coming to wear much lighter clothing in the winter time—no more heavy Scotch flannels and consequently no steam jacket or moist skin with subsequent cold when exposed to a lower temperature. In outdoor sleeping it is exceedingly important that the clothing beneath the patient be quite as much as that above. Another thing is that the patient should wear a union suit so that in turning over no part of the skin would be exposed."

Dr. Northrup exhibited pictures of patients undergoing the cold fresh air treatment on the roof of the Presbyterian Hospital, showing the arrangement of cots, etc.

Discussion: Dr. W. F. Hamilton: I have been much interested in Dr. Northrup's remarks and in reply to his question concerning our procedure in Montreal, I may say that we have little difficulty in this country in securing cold air for the treatment of pneumonias during the winter. In the Royal Victoria Hospital, outside the wards are verandahs on which such patients may be placed, but during the months of January, February, and March, we content ourselves with the side rooms of the ward, each of which has two

windows which are kept wide open and through which moving, as well as cold, air can easily be obtained. In private practice we follow this principle of fresh air fairly closely. I am interested in the statistics of pneumonia and I am sure some day Dr. Northrup will give us his. We have looked up to Dr. Northrup for encouragement to persist with this measure and if this method is effective a marked reduction in the percentage of mortality will eventually be recorded. At present I am despairing of doing much, if any, good in pneumonia, and to make a record as they are found in the books on medicine, compiled from thirty to forty years' records, one will find that the mortality averages 19 per cent., 20 per cent. or 21 per cent.; if you take statistics extending over eighteen or twenty years, as in the Royal Victoria Hospital where we have treated over eight hundred cases of lobar pneumonia, it is 19·7 per cent. These figures to my mind are very significant of the futility of treatment. If one remembers the fact that these figures express the experience of the European, American, British, and Canadian, and that these patients have been treated by methods most various, it is significant, I think, that treatment so far has had little to do with recovery or fatality. I hope that when the fresh air record is figured out the percentage of mortality will be 15 per cent. or even 10 per cent.

Dr. A. D. Blackader: At the present day all physicians appreciate the value of cold air. The treatment of tuberculosis has taught us what a powerful remedial agent pure cold air may be. The effects on the body of cold air are two-fold. There is an actual abstraction of heat, which is rarely desirable, and which so far as possible should be prevented. This loss takes place to a slight extent only by evaporation, perhaps somewhat more by radiation; the chief loss is by convection, and is dependent upon the amount of moisture in the air, and on the rapidity of its movement. On a clear, bright frosty day with but little wind and the temperature many degrees below zero, a person properly clad loses little heat by any of these methods, and may spend a long time out of doors without any unpleasant sensation of cold. On the contrary when a moist east wind blows, even with the thermometer many degrees above the freezing point, heat is easily abstracted and every one suffers from depressing chilly sensations.

More important from the therapeutic standpoint is the second effect: i.e. the stimulating action of dry cold air on the delicate sentient nerves of the periphery, and just as a cold bath to a vigorous man is a source of energy, so cold frosty air to a man with an

active vasomotor centre is a powerful stimulant to cardiac, respiratory and muscular systems; oxidation is increased and nutrition becomes more active. As has been pointed out by Sewall, of Denver, the free flowing, frequently changing air of the open, is undoubtedly one of the most powerful stimuli which we have on our vasomotor centres. I am glad to hear Dr. Northrup refer to the experiments of Howland and Hoobler on the effect of cold air on the blood pressure in pneumonia. Its chief influence appears to be exerted on the delicate nerves of the Schneiderian membrane and from them to be transmitted promptly to the vasomotor centre. The reflex from the Schneiderian membrane has long been recognized as a prompt and powerful method of securing stimulation in an emergency and it is therefore important for us to know that we can secure a very definite stimulation to flagging centres by the inhalation of cold air through the nostrils. But the cold air must be inhaled through the nostrils to secure this stimulation. No stimulation and only harm results when the patients breathe the cold air through the mouth. Especially is this the case in children —children that keep their mouths shut and breathe through the nose, provided they are warmly clad, enjoy our frosty air and receive benefit from it; but a child with obstructed nares, that breathes through its mouth, finds the cold dry air to be an irritant to its mucous membrane which may readily excite a laryngitis or bronchitis.

ONTARIO MEDICAL ASSOCIATION

THE next meeting of the Ontario Medical Association will be held in Peterboro in May, 1915. Arrangements are now being made to have this annual meeting in conjunction with the Medical Health Officers' Association, so that the attendance will be large, and members will be sure of reduced fares on the railways.

The following is a list of the committees:

President, D. J. Gibb Wishart, Toronto; general secretary, F. Arnold Clarkson, 421 Bloor Street West, Toronto; local secretary, J. E. Mann, Peterboro.

Committees

ARRANGEMENTS: T. W. H. Young, chairman; N. H. Sutton, secretary; J. H. Eastwood, D. C. King, B. E. Kelly, of Peterboro;

R. H. Bonnycastle, Campbellford; H. A. Turner, Millbrook; W. A. Ross, Barrie; J. Holdcroft, Havelock; W. G. Collison, Lindsay.

PAPERS AND BUSINESS: H. J. Hamilton, Toronto, chairman; G. S. Cameron, Peterboro, vice-chairman; George S. Strathy, Toronto, secretary; A. W. McPherson, Peterboro, local secretary; T. N. Greer, J. A. Morgan, J. V. Gallivan, J. M. McCulloch, and D. N. Carmichael, Peterboro; and the chairmen and secretaries of the sections, as follows:

SURGERY: C. L. Starr, Toronto, chairman; F. P. McNulty, Peterboro, local chairman; A. Moorehead, Toronto, secretary; E. V. Frederick, Peterboro, local secretary.

MEDICINE: A. R. Gordon, Toronto, chairman; F. C. Neal, Peterboro, local chairman; George S. Strathy, Toronto, secretary; L. S. Hammond, Peterboro, local secretary.

OBSTETRICS AND GYNÆCOLOGY: W. D. Scott, Peterboro, chairman; A. Moir, Peterboro, secretary.

EYE, EAR, THROAT AND NOSE: N. D. Buchanan, Peterboro, chairman; W. W. McKinley, Port Hope, secretary.

CREDENTIALS: W. K. Colbeck, Welland, chairman; J. W. S. McCullough, Toronto; S. H. McCoy, Toronto; T. N. Greer, Peterboro; A. G. Hore, Markham; D. N. Carmichael, Peterboro.

PUBLIC HEALTH: W. E. Olmsted, Niagara Falls, chairman; G. M. Davis, Welland; C. J. O. Hastings, Toronto; Lorne Drum, Ottawa; D. M. Anderson, George D. Porter, Toronto.

PUBLICATION: W. A. Young, Toronto; chairman, J. Ferguson, J. T. Fotheringham, Toronto; R. W. Powell, Ottawa.

BY-LAWS: J. H. McGarry, Niagara Falls, chairman; J. Malloch, Toronto; W. T. Connell, Kingston; C. P. Lusk, A. R. Gordon, Toronto; B. C. Bell, Brantford.

ETHICS: J. L. Bradley, Creemore, chairman; J. D. Ivey, Cobourg; E. T. Kellam, Niagara Falls; S. Johnston, Toronto; C. H. Bird, Gananoque; W. T. Parke, Woodstock,; R. S. Hoig, Oshawa.

EXECUTIVE: The president, secretary, and treasurer *ex-officio;* G. S. Cameron, Peterboro; R. R. Wallace, Hamilton.

NECROLOGY: J. H. Elliott, Toronto, chairman; W. H. Cameron, Conniston; Lorne Robertson, Stratford.

AUDIT: J. A. Amyot, Toronto, chairman; G. Boyd, Toronto; J. M. Rogers, Ingersoll; E. E. Harvey, Norwich; A. McKinnon, Guelph; C. Meyers, F. N. G. Starr, R. J. Wilson, Toronto; D. E. Mundell, Kingston; F. Williams, Bracebridge.

SANITARY INSPECTORS' ASSOCIATION OF WESTERN CANADA

THE second annual meeting of the Sanitary Inspectors' Association of Western Canada was held at Winnipeg on Wednesday, Thursday, and Friday, July 15th to 17th, last. On Wednesday morning, a civic welcome was given to the members by the mayor, Mr. T. R. Deacon, and by Mr. Munroe, chairman of the health committee: this was followed by the presidential address, which was delivered by Mr. E. W. J. Hague. The most important feature of the meetings was a series of visits of inspection and the convention closed on Saturday morning with a visit to Kinalmeaky Farm. The object of the association is to improve sanitation throughout the province and to raise the status of the sanitary inspector, and in order to achieve the latter purpose an effort is being made to enroll as many associate members as possible and encourage them to take the examinations of the Royal Sanitary Institute of London. Good progress has been made during the past year and the membership now includes forty-six members and thirty-eight associate members. Since the first annual meeting of the association, which took place at Regina in September of last year, an examination board of the Royal Sanitary Institute has been established at Winnipeg. A library has also been established there, consisting of books on sanitation in its different branches and current magazines dealing with sanitary matters. It is probable that a branch of the Institute may be established in Calgary before very long, as it is impossible for many of those who otherwise would take the examinations to go to Winnipeg for that purpose. In Saskatchewan fortnightly meetings were held during the winter months at Regina, Moose Jaw, and Saskatoon, at which subjects in the syllabus of examination were taken up and lectures of practical interest to the sanitarian were given. The question of the dismissal of inspectors was discussed at the meeting and it was considered that such dismissals should be subject to the approval of the provincial board of health. The matter was referred to the executive committee.

SASKATCHEWAN MEDICAL ASSOCIATION

THE eighth annual meeting of the Saskatchewan Medical Association, which was held at Saskatoon, August 18th, 19th, and 20th, was avowedly the most successful gathering ever held by the

association, and reflects great credit upon the president, Dr. Peterson, and the secretary, Dr. J. T. MacKay. After the reception and registration of members, the reports of the various committees were submitted. Among these, that of Dr. A. Wilson, chairman of the committee on public health, was of particular interest. It was based on the replies received from the secretaries of the rural municipalities in the province, to whom a set of questions had previously been sent. A committee was appointed to discuss the matter and they submitted the following recommendations which, it was agreed, should be forwarded to the minister in charge of public health at Regina: "Resolved that the province of Saskatchewan be divided into four or more health districts, each under the supervision of a fully qualified health officer, under the direction of the provincial public health department: that the above officers be required to devote their entire time to the health matters within their respective districts, and that at least one nurse be engaged for each district under the supervision of the district medical health officer." It was considered that the province of Saskatchewan had now reached such a stage in its development that the management of the details of public health work in all parts of the province necessitated some such arrangement as the above. The local health organizations should be more conversant with all matters pertaining to public health in their municipality, and the local health officers should be trained for the special work they undertake and should devote their whole time to it; moreover, the great distances from which the food and milk supplies are brought make it all the more important that they should be subject to careful and expert examination. The distribution of physicians in rural districts is by no means uniform and a large section of the province is without adequate medical service. It was thought that these matters might be remedied were the proposed recommendations put into practice, and that the deportation of undesirables would be facilitated and a more prompt and efficient service be obtained from the local organizations.

On invitation Mr. W. J. Thompson, a director at large of the Grain Growers' Association, addressed those present. Instances had occurred during the past year in which the local Grain Growers' Associations had supported the claims of men who alleged that they had been overcharged by members of the medical profession. The matter had been discussed somewhat freely in the public press from the layman's point of view; the other side was now presented to Mr. Thompson and it was arranged that the president of the medical

council should appoint an official representative whose duty it should be to attend each meeting of the Grain Growers' Association, so that matters of common interest might be amicably arranged.

The papers read at the conference were interesting and were followed by discussions involving a wide range of opinions. Of particular merit were those by Dr. A. R. Gordon, of Toronto, on "The damaged heart and its management;" by Dr. J. M. Elder, of Montreal, on "The acute abdomen;" by Dr. C. G. Sutherland, of Moose Jaw, on "The future of our profession;" and by Dr. W. R. Tutt, assistant superintendent of the North Battleford Asylum, on "The immigration problem."

The officers elected for the ensuing year are, honorary president, Dr. G. R. Peterson, Saskatoon; president, Dr. G. P. Bawden, Moose Jaw; first vice-president, Dr. F. A. Corbett, Regina; second vice-president, Dr. A. Croll, Saskatoon; secretary-treasurer, Dr. C. G. Sutherland, Moose Jaw, Executive council, Dr. T. M. Leask, Moose Jaw; Dr. J. W. Turnbull, Regina; and Dr. J. H. Storry, Tuxford. It was decided that in future the annual meetings of the association should be held on the last Tuesday in July. The next meeting will take place at Moose Jaw.

ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS

THE fourteenth annual convention of the Canadian Association for the Prevention of Tuberculosis, held in Halifax on July 13th and 14th, was one of the most successful in the history of the society. In point of attendance, in the quality of papers presented, and in the reports from local societies it was most encouraging. In the unavoidable absence of the president, Sir Adam Beck, his address was read by the secretary. In it the president took occasion to congratulate the Federal Government upon its new measure directed towards the prevention of the spread of tuberculosis amongst cattle supplying milk to dairies.

The public lecture in the evening by Dr. A. S. Knopf, of New York, was largely attended and well received. Among other prominent men upon the platform was the Honourable Mr. Armstrong who spoke on behalf of the Premier of the province. He mentioned the fact that legislation was being enacted in Nova Scotia aiming towards the suppression of tuberculosis and providing for more accommodation for the tuberculous in that province.

In the symposium upon legislative action Dr. Bruce Smith,

Dr. W. H. Hattie, Dr. A. F. Miller and Dr. Smith L. Walker presented papers which were discussed by Sir James Grant, Drs. Montizambert, Bryce, Hodgetts, J. W. S. McCullough, Parsons, John Stewart, J. B. Black, and others. Dr. J. Roddick Byers and Dr. J. H. Elliott presented papers upon "milk" and "bovine tuberculosis." Dr. Gordon, of Ottawa, upon the "care of advanced cases," and Miss Eunice Dyke, of Toronto, upon the "tuberculosis nurse."

The secretary's report, which covered the work done in Canada during the year, showed that more progress had been made than in any previous year. No less than nine new institutions for the tuberculous had been opened during the year, while much educational work had been accomplished.

Among other resolutions passed at the meetings was one calling upon the federal authorities for the formation of a Public Health Department. A resolution was passed at the Executive Council in favour of the association meetings being held in the same place as those of the Canadian Medical Association, either immediately preceding or following the same. The delegates were well looked after in a social way, the sail around the harbour and motor drives being most enjoyable.

The officers elected for ensuing year were: president Colonel Jeffrey H. Burland, Montreal; honorary treasurer, George Burn, Esq., Ottawa; secretary, George D. Porter, M.B., Toronto.

PRINCE EDWARD ISLAND MEDICAL ASSOCIATION

The annual meeting of the Prince Edward Island Medical Association was held at Charlottetown on Thursday, July 16th, about twenty members being in attendance. The reading of the reports of committees was followed by the election of officers for the year 1914-1915; they are, president, Dr. J. Jardine; treasurer, Dr. Conroy; secretary, Dr. J. C. McDonald. In the afternoon the members were taken by motor boat to Falconwood, where the afternoon session was held. The presidential address was delivered by Dr. W. J. McMillan, who spoke on the relation of the medical profession to public health. He thought that much might be done by physicians to further the cause of public health and sanitation, even though they reaped no pecuniary advantage from so doing. Deploring the unfortunate lack of interest manifested throughout the province in the matter of statistics, Dr.

McMillan impressed upon those present the importance of vital statistics and of the prompt notification of cases of contagious and infectious disease. Another topic touched upon by the president was the medical inspection of schools; as yet there is no such system in Prince Edward Island. He strongly advocated the establishment of such inspection and thought that great benefit might accrue to the pupils if lectures on hygiene and sanitation were given in the schools by competent medical men. The proposal to establish a provincial pathological and bacteriological laboratory in the province, he said, was now under consideration by the government. In conclusion, Dr. McMillan referred to the work accomplished by Sir Thomas Roddick in connexion with the new Canada Medical Act and suggested that a vote of congratulation be sent to Sir Thomas upon his well-merited knighthood. The address was followed by a paper by Dr. Goodwill on dementia præcox, and one by Dr. Tanton on lung abscess. At the evening session some interesting papers were read. Next year the association will meet at Summerside.

NEW BRUNSWICK MEDICAL SOCIETY

THE thirty-fourth annual meeting of the New Brunswick Medical Society was held in St. John on July 21st, as required by statute. On account of the Canadian Medical Association having recently met there, the provincial society abandoned its usual scientific programme and simply transacted necessary business.

Officers were elected as follows: president, Dr. G. C. Van Wart, Fredericton; first vice-president, Dr. G. W. Fleming, Petitcodiac; second vice-president, Dr. W. W. White, St. John; secretary, Dr. D. C. Malcolm, St. John; treasurer, Dr. C. M. Pratt, St. John; trustees, Dr. H. E. Gillmor, St. Martins; Dr. W. A. Christie, St. John; Dr. B. H. Dougan, Harvey.

Delegates to Executive of the Canadian Medical Association: Dr. J. S. Bentley, St. John, and Dr. C. T. Purdy, Moncton; members of the Council of Physicians and Surgeons of New Brunswick: Dr. J. D. Lawson, St. Stephen; Dr. W. W. White, St. John; Dr. L. M. Curren, St. John; Dr. A. F. Emery, St. John; Dr. T. F. Sprague, Woodstock. It was decided to hold the next annual meeting in Fredericton.

MEDICAL HEALTH OFFICERS OF NOVA SCOTIA

We are requested by Dr. Bryce to correct an error in the report of his remarks at the meeting of the Medical Health Officers of Nova Scotia, held in Halifax, July 15th. The reports states, "Dr. Bryce states that the death rate of Nova Scotia was just double that of Ontario." Dr. Bryce wishes it to be understood that the remarks he was making at the moment referred to tuberculosis. He finds the actual figures as given in the last report available for Ontario of deaths from tuberculosis per thousand 1·02 while the death rate for five years in Nova Scotia preceding 1913 was 1·79. The statement for the whole province is too high, but the error is one which perhaps is excusable in a general reference rather than a statistical reference.

VALLEY MEDICAL SOCIETY

The Valley Medical Society met at Bear River, Nova Scotia, September 7th. The annual meeting of the society was held at Middleton on June 12th. On this occasion the reports of the president and the secretary-treasurer were presented and the officers for the year 1914-1915 were elected: they are, president, Dr. M. E. Armstrong, Bridgetown; vice-presidents, Kings County, Dr. A. S. Burns, Kentville; Annapolis County, Dr. R. L. Morse, Lawrencetown; Digby County, Dr. T. H. MacDonald, Meteghan; secretary-treasurer, Dr. W. T. M. MacKinnon, Berwick.

Medical Societies

CANADIAN MEDICAL ASSOCIATION:—President—Dr. Murray MacLaren, St. John, N.B. President-elect—Dr. R. E. McKechnie, Vancouver. Secretary-treasurer—Dr. W. W. Francis, 836 University Street, Montreal.
Annual Meeting, Vancouver, B.C., 1915.

ACADEMY OF MEDICINE, TORONTO:—President—Dr. H. B. Anderson. Secretary—Dr. J. H. Elliot.

ALBERTA MEDICAL ASSOCIATION:—President—Dr. R. G. Brett, Banff. Secretary—Dr. F. C. Clarke, Calgary.

ASSOCIATION OF MEDICAL OFFICERS OF THE MILITIA:—President—Lt.-Colonel A. T. Shillington, A.M.C., Ottawa. Secretary—Captain T. H. Leggett, A.M.C., Ottawa.

BRITISH COLUMBIA MEDICAL ASSOCIATION:—President—Dr. J. Glen Campbell, Vancouver. Secretary—Dr. H. W. Riggs, Vancouver.

CALGARY MEDICAL SOCIETY:—President—Dr. G. Johnston. Secretary—Dr. J. L. Allen.

CANADIAN ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS:—President—Dr. J. G. Adami, Montreal. Secretary—Dr. George D. Porter, Ottawa.

CANADIAN HOSPITAL ASSOCIATION:—President—Dr. H. A. Boyce, Belleville. Secretary—Dr. J. N. B. Brown, Toronto.

CANADIAN PUBLIC HEALTH ASSOCIATION:—President—Dr. C. A. Hodgetts. General Secretary—Major Lorne Drum.

CENTRAL SOUTHERN ALBERTA MEDICAL SOCIETY:—President—Dr. J. S. Murray, Okotoks. Secretary-treasurer—Dr. G. E. Learmonth, High River.

COLCHESTER-HANTS MEDICAL SOCIETY:—President—Dr. J. W. T. Patton, Truro. Secretary—Dr. H. V. Kent, Truro.

EDMONTON MEDICAL SOCIETY:—President—Dr. J. S. Wright. Secretary-treasurer—Dr. Jamieson.

ELGIN COUNTY MEDICAL ASSOCIATION:—President—Dr. Frederick McEwen, Aylmer, Ont. Secretary-Treasurer—Dr. A. B. Riddell, Bayham.

FRASER VALLEY MEDICAL SOCIETY:—President—Dr. DeWolfe Smith. Secretary—Dr. D. F. Carswell.

HALIFAX MEDICAL ASSOCIATION:—President—Dr. Kirkpatrick. Secretary—Dr. MacIntosh.

KINGSTON MEDICAL AND SURGICAL SOCIETY:—President—Dr. W. G. Anglin. Secretary—Dr. W. T. Connell. Treasurer—Dr. G. W. Mylks.

LONDON MEDICAL ASSOCIATION:—President—Dr. C. H. Reason, 538 Dundas Street. Secretary-treasurer—Dr. L. S. Holmes, 260 Hamilton Road.

LUNENBURG-QUEEN'S MEDICAL SOCIETY:—President—Dr. J. W. Smith, Liverpool. Secretary—Dr. L. T. W. Penney, Lunenburg.

MANITOBA MEDICAL ASSOCIATION:—President—Dr. H. A. Gordon, Portage La Prairie. Secretary—Dr. R. B. Mitchell, Winnipeg.

MEDICINE HAT MEDICAL SOCIETY:—President—Dr. O. Boyd. Vice-President—Dr. H. Orr. Secretary-treasurer—Dr. W. Knight.

MONTREAL MEDICO-CHIRURGICAL SOCIETY:—President—Dr. D. F. Gurd. Secretary—Dr. Hanford McKee

MOOSE JAW MEDICAL SOCIETY:—President—Dr. Geo. P. Bawden. Secretary-treasurer—Dr. C. G. Sutherland.

NEW BRUNSWICK MEDICAL SOCIETY:—President—G. Clowes Van Wart, Fredericton. Secretary—J. S. Bentley.

NIAGARA DISTRICT MEDICAL ASSOCIATION:—President—Dr. E. T. Kellam, Niagara Falls. Secretary—Dr. G. M. Davis, Welland.

NOVA SCOTIA MEDICAL SOCIETY—President—Dr. G. E. DeWitt. Secretary—Dr. J. R. Corston.

ONTARIO MEDICAL ASSOCIATION:—President—Dr. D. Gibb Wishart, Toronto. Secretary—Dr. F. A. Clarkson, 421 Bloor Street West, Toronto. Local Secretary—Dr. J. B. Mann, Peterborough.
Annual Meeting, Peterborough, May, 1915.

OTTAWA MEDICO-CHIRURGICAL SOCIETY:—President—Dr. J. F. Argue. Secretary—Dr. R. K. Paterson. Treasurer—Dr. A. S. McElroy.

OTTAWA MEDICAL SOCIETY:—President—Dr. Charles W. Gorrell. Secretary—Dr. A. MacLaren. Treasurer—Dr. Harold Alford.

PERTH MEDICAL ASSOCIATION:—President—Dr. A. F. McKenzie, Monkton. Secretary-treasurer—Dr. F. J. R. Forster, Stratford.

PETERBORO MEDICAL ASSOCIATION:—President—Dr. E. A. Hammond. Secretary—Dr. J. B. Mann.

PICTOU COUNTY MEDICAL ASSOCIATION:—President—Dr. C. S. Elliot, Stellarton. Secretary—Dr. John Bell, New Glasgow.

PRINCE EDWARD ISLAND MEDICAL ASSOCIATION:—President—Dr. A. A. MacDonald. Secretary—Dr. W. J. MacMillan, Charlottetown.

REGINA MEDICAL SOCIETY:—President,—Dr. Gorrell. Secretary—Dr. Dakin.

ST. JOHN MEDICAL SOCIETY:—President—Dr. D. Malcolm. Secretary—Dr. F. P. Dunlop.

SASKATCHEWAN MEDICAL ASSOCIATION:—President—Dr. G. P. Bawden. Secretary—Dr. C. G. Sutherland, Moose Jaw.
Annual meeting, Moose Jaw, July 27th, 1915

SASKATOON MEDICAL ASSOCIATION:—President—Dr. Geo. R. Morse. Secretary-Treasurer—Dr. D. H. MacDonald.

SWIFT CURRENT DISTRICT MEDICAL ASSOCIATION:—President—Dr. Graham. Secretary-treasurer—Dr. Hughes.

THUNDER BAY MEDICAL SOCIETY:—President—Dr. R. J. Manion. Vice-President—Dr. Eakins. Secretary-treasurer—Dr. J. G. Hunt.

VALLEY MEDICAL SOCIETY:—President—Dr. M. E. Armstrong, Bridgetown. Secretary—Dr. T. M. MacKinnon, Berwick, N.S.

VANCOUVER MEDICAL ASSOCIATION:—President—Dr. W. D. Keith. Secretary—Dr. J. H. MacDermot.

WEST ELGIN MEDICAL SOCIETY:—President—Dr. Crane, Wallacetown. Vice-president—Dr. Webster, West Lorne. Secretary-treasurer—Dr. Smith, Fingal.

WINNIPEG MEDICAL SOCIETY:—President—Dr. J. R. Jones. Secretary—Dr. S. Alwyn Smith.